

Nakamichi

Service Manual

Nakamichi
BX-150
BX-150E

2 Head Cassette Deck



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1. GENERAL

1.1. Voltage Selector

Voltage selector is installed on the rear panel for Other version of the Nakamichi BX-150. This voltage selector can select either 120 V or 220-240 V at customer's disposal.

1.2. Packing Materials and Owner's Manual

Part No.	Description	Q'ty
0F03738A	Carton Box BX-150 (Silver)	1
0F03739A	Carton Box BX-150 (Black)	1
0F03752A	Carton Box BX-150E (Silver)	1
0F03753A	Carton Box BX-150E (Black)	1
0F03674B	Packing	2
0D04313A	Owner's Manual (BX-150 (U.S.A., Canada & Australia) & BX-150E (UK))	1
0D04314A	Owner's Manual (BX-150 (Japan))	1
0D04318A	Owner's Manual (BX-150 (Others) & BX-150E (220V Class 2))	1

1.3. Serial Number

The BX-150 has two versions, Silver and Black.

In the service manual, serial numbers of these versions are identified as follows:

Silver version: A320xxxx

Black version: A321xxxx

However, the actual serial number on the serial number plate of the BX-150 is indicated as A320.1xxxx. The serial number begins with A320.101001.

2. MECHANICAL ADJUSTMENTS

2.1. Tape Guide Height Check for Record/Playback Head and Erase Head

With use of an M-300 produced by Information Terminals, tape guide height check for the Record/Playback and Erase Heads shall be made, wherein a small block shall be pushed straight down to the base while in use of the M-300. Refer to Fig. 2.1.

(1) Record/Playback Head Tape Guide Height

- Load the base of the M-300 carefully, then set the cassette deck in Play mode.
- Place the small block of the M-300 on the base.
- Slide the small block against the tape guide of the Record/Playback Head, and check to insure that the block is accepted by the tape guide.
- If not, loosen the screw and insert a shim (either 30 μ m (OC80048A), 60 μ m (OC80038A), or 100 μ m (OC80039A)) to raise the Record/Playback Head, then tighten and apply a quantity of lock tight paint to the screw.

(2) Erase Head Tape Guide Height

- Load the base of the M-300 carefully, then set the cassette deck in Play mode.
- Place the small block of the M-300 on the base.
- Slide the small block against the tape guide of the Erase Head, and check whether the block is accepted by the tape guide.

2.2. Head Base Stroke Check

Refer to Fig. 2.2.

- Load the base of the M-300 carefully, then push the base toward the Record/Playback Head to eliminate the clearance between the reference pin and the base.
- Set the cassette deck in Play mode.
- Place the small block of the M-300 on the base.
- Contact the small block with the Record/Playback Head surface and the Erase Head surface, and check whether the end of the small block is located within the specified tolerance as shown in the figure.

2.3. Record/Playback Azimuth Alignment and Height Check

Refer to Fig. 2.1.

- Connect a VTVM to the Output Jacks.
- Load a 15 kHz Azimuth Tape (DA09004B), then set the cassette deck in Play mode.
- Turn the Azimuth Alignment Screw until the outputs of both channels become maximum.
- Load a 1 kHz Track Alignment Tape (DA09007B), then set the cassette deck in Play mode.
- Check to insure that the readings of both channels on the VTVM are below -25 dB.
- If not, replacement of the Record/Playback Head will be required.
- Apply a quantity of lock tight paint to the Azimuth Alignment Screw.

2.4. Pressure Adjustment of Pressure Roller

Refer to Fig. 2.3.

- In Play mode, measure the torque of the Pressure Roller and check whether the torque is in a range of 320 ± 50 g-cm.
- If torque is out of the range, correct it by changing the installation point of the Pressure Roller Spring.

2.5. Tape Travelling Check

Load the Tape Travelling Cassette (DA09027B), then set the cassette deck in Play mode and check the following:

- After more than 2 seconds, the fluctuation of the tape travelling on the Record/Playback Head is small.
- Tape is in contact with the head sufficiently.
- Tape waving is small on the heads and pressure roller.

2.6. Eject Damper Adjustment

Refer to Fig. 2.4. Load a cassette tape, and with opening the Cassette Case by pressing the Eject button and closing it by hand, adjust the speed of damper movement by the Adjustment Screw.

CCW: Damper moves fast.
CW: Damper moves slowly.

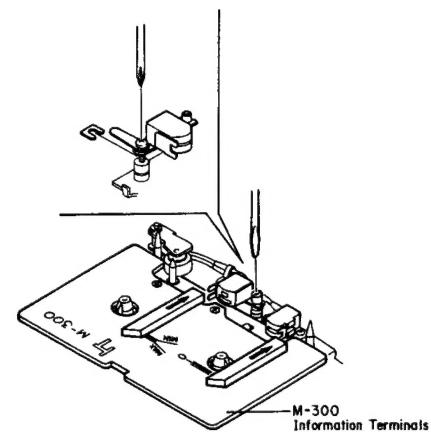


Fig. 2.1

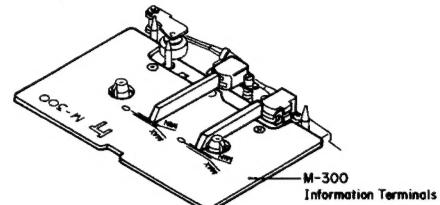


Fig. 2.2

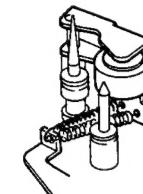


Fig. 2.3

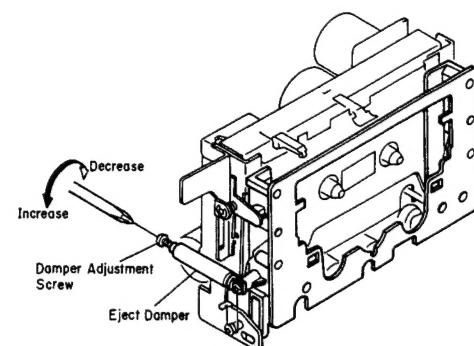


Fig. 2.4

2.7. Reel Motor Speed Adjustment in Play Mode

- (1) To warm-up the cassette deck, load a C-60 cassette tape and set the cassette deck in Play mode.
- (2) After more than four minutes, load a torque meter TW-211 (made by Sony) and set the cassette deck in Play mode.
- (3) Adjust VR601 on the Main P.C.B. Ass'y to obtain exactly 50 g-cm on the torque meter.

2.8. Tape Speed Adjustment

Refer to Fig. 2.5.

- (1) Connect a frequency counter to the Output Jacks.
- (2) Load a 3 kHz Speed and Wow/Flutter Tape (DA09006C) and Play it back.
- (3) Adjust the Tape Speed Adjustment Volume incorporated in the Capstan Motor to obtain 3,000 Hz on the frequency counter.

CCW: Motor drives slowly.

CW: Motor drives fast.

2.9. Lubrication

The tape transport is of a lubrication-free type mechanism. When the following parts are replaced, apply the specified lubricant.

- (1) Molykote (R) Grease (X5-6020)
Cam Motor Pulley
Thrust portion on the Capstan Shaft
- (2) FLOIL GB-TS-1
Washer between Reel Hub Ass'y and Back Tension Spring
- (3) Diamond Oil (EP56)
Reel Hub Shaft
- (4) Anderol 456
Capstan Shaft

Note: We suggest that you use the above specified lubricant or equivalent type.

The company dealing in the above lubricant is as follows:

- (a) Molykote (R) Grease (X5-6020)
Dowcorning Co., Ltd., 1-15-1 Nishishinbashi, Minato-ku, Tokyo, Japan
- (b) FLOIL GB-TS-1
Kanto Chemicals Co., Ltd., 2-7 Kanda Sakuma-cho, Chiyoda-ku, Tokyo, Japan
- (c) Diamond Oil (EP-56)
Mitsubishi Oil Co., Ltd., 1-2-4 Toranomon, Minato-ku, Tokyo, Japan
- (d) Anderol 456
Toyo Kokusai Oil Co., Ltd., 3-3-5 Hatchobori, Chuo-ku, Tokyo, Japan

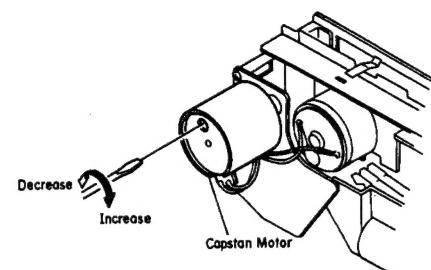


Fig. 2.5

3. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

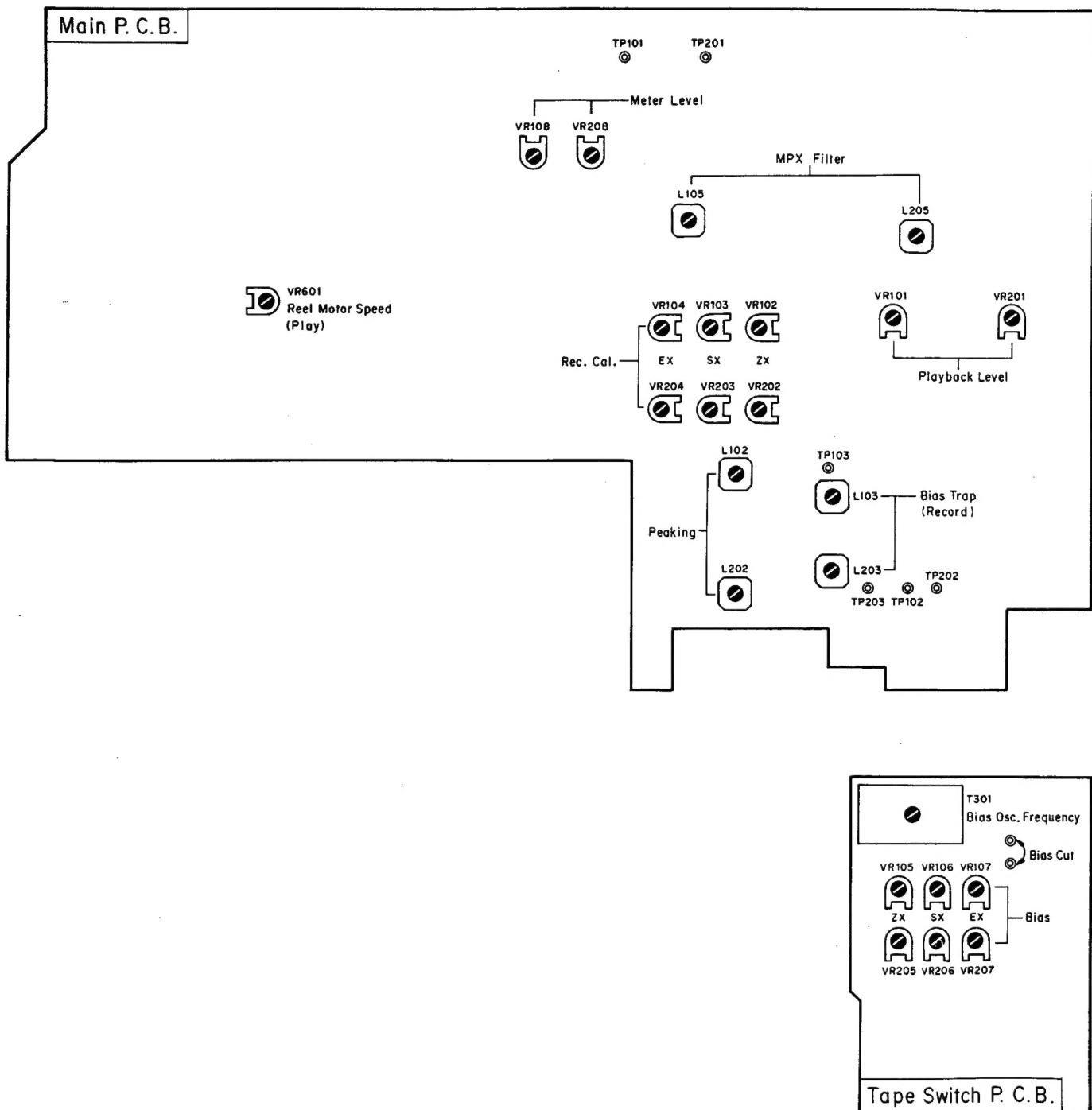


Fig. 3

4. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Note: Electrical adjustment should be performed after mechanical adjustment is completed.
 4.1. Adjustment and Measurement Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Frequency Counter to Output Jacks	Playback Eq. SW — 70 μ s	Tape Speed Adjustment Volume	Adjust the volume incorporated in the capstan motor to obtain 3 kHz $\pm 0.5\%$ on the frequency counter.
2	Meter Level Calibration	400 Hz to Input Jacks	VTVM to TP101, TP201 on Main P.C.B.	Record, Pause	Main P.C.B. VR108,VR208	<ol style="list-style-type: none"> 1. Feed in 400 Hz, then adjust the Input Level control to obtain 350 mV —0.8 dB on the VTVM. 2. Adjust VR108 (VR208) so that the 0 dB segment of the level meter starts illuminating. 3. Adjust the Input Level control to obtain 350 mV on the VTVM, then decrease the generator output level by 20 dB. 4. Check to insure that the segment for —20 dB illuminates.
3	MPX Filter Adjustment	19 kHz ± 100 Hz to Input Jacks	VTVM to Output Jacks	Record, Pause MPX SW — OFF/ON	Main P.C.B. L105,L205	<ol style="list-style-type: none"> 1. Adjust the Input Level control to obtain 0 dB (500 mV) on the VTVM. 2. Set the MPX Filter switch to ON, then adjust L105 (L205) to obtain minimum reading on the VTVM (minimum reading will be less than —30 dB).
4	Record/Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004B)	VTVM to Output Jacks	Playback Eq. SW — 70 μ s Dolby NR SW — OFF MPX SW — OFF	Record/Playback Head Azimuth Alignment Screw	Adjust the Record/Playback Head Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM.
5	Playback Level Calibration	400 Hz Level Tape (DA09005B)	VTVM to TP101, TP201 on Main P.C.B.	Same as above	Main P.C.B. VR101,VR201	Adjust VR101 (VR201) to obtain 350 mV on the VTVM.
6	Playback Frequency Response Adjustment	400 Hz Level Tape (DA09005B) 10 kHz PB Frequency Response Tape (DA09003B) 15 kHz PB Frequency Response Tape (DA09002B) 20 kHz PB Frequency Response Tape (DA09001B)	VTVM to Output Jacks	Playback Eq. SW — 70 μ s Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. R110,R210 R195,R295	<ol style="list-style-type: none"> 1. Load a 400 Hz level tape and play it back. 2. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the record/playback head azimuth to obtain maximum levels on the VTVM with each tape. 3. Read the maximum levels with each tape and check to insure that the levels against the 400 Hz level tape are within the following ranges. If not, short R110 (R210) or R195 (R295) on the Main P.C.B. Ass'y to obtain satisfactory results. 10 kHz (—20 dB) —2 dB to +2 dB 15 kHz (—20 dB) —2 dB to +3 dB 20 kHz (—20 dB) —2 dB to +4 dB Check to insure that the difference in level between 10 kHz (—20 dB) and 20 kHz (—20 dB) is less than 2 dB. Refer to the "Playback Frequency Response Adjustment" in item 4.2 for the detailed description. 4. Conduct step 4 "Record/Playback Head Azimuth Alignment".
7	Bias Oscillation Frequency and Erase Current Adjustment		Frequency Counter to TP102 on Main P.C.B. and VTVM across the additional 0.1 Ω resistor	Record, Pause Tape SW — ZX Eq. SW — 70 μ s Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. T301 R318,R350	<ol style="list-style-type: none"> 1. Adjust T301 to obtain 105 kHz on the frequency counter. 2. Connect an additional 0.1 Ω resistor in series to the Erase Head, then connect a VTVM across it. 3. Check the erase current by the VTVM. Erase current will be in a range of 145 mA to 185 mA (typically approx. 165 mA). If erase current is not sufficient, increase it by shorting R318 or R350. 4. After completion of the erase current adjustment, re-check the bias oscillation frequency. 5. Remove the additional 0.1 Ω resistor.
8	Record Amplifier Equalizer Adjustment	21 kHz (—20 dB) to Input Jacks	VTVM to TP102, TP202 on Main P.C.B.	Same as above	Main P.C.B. L102,L202	<ol style="list-style-type: none"> 1. Short both Bias Stop test pins with a clip to stop the bias oscillation. 2. Adjust L102 (L202) to obtain peak reading at 21 kHz on the VTVM. 3. Remove the clip from the test pins.
9	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TP103, TP203 on Main P.C.B.	Same as above	Main P.C.B. L103,L203	Adjust L103 (L203) to obtain maximum reading on the VTVM.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
10	Record Level Calibration and Recording Bias Current Adjustment	400 Hz (0 dB), 400 Hz (−20 dB), 10 kHz (−20 dB) and 17 kHz (−20 dB) to Input Jacks	VTVM to TP101, TP201 and TP102, TP202 on Main P.C.B. and VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW — C-Type/B-Type/ OFF MPX SW — OFF	Main P.C.B. (Level) ZX: VR102, VR202 SX: VR103, VR203 EX: VR104, VR204 (Bias) ZX: VR105, VR205 SX: VR106, VR206 EX: VR107, VR207	<p>Adjustment should be made in the order of ZX, SX and EX.</p> <ol style="list-style-type: none"> 1. Set the Dolby NR switch to C-Type. 2. Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y. 3. Set the BX-150 in Record/Pause mode. 4. Feed in 400 Hz, then adjust the Input Level control to obtain 350 mV (0 dB) on the VTVM. 5. Load a reference ZX tape (DA09037B), reference SX tape (DA09025B) and reference EXII tape (DA09066B). 6. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EXII to center positions. 7. Connect the VTVM to TP102 (TP202) on the Main P.C.B. Ass'y. Adjust Bias VR105 (VR205) for ZX, VR106 (VR206) for SX and VR107 (VR207) for EXII to obtain the following bias current in Record/Pause mode (the VTVM is connected across a 10-ohm resistor). <ul style="list-style-type: none"> ZX: approx. 1 mA SX: approx. 0.5 mA EXII: approx. 0.3 mA 8. Connect the VTVM to the Output Jacks. 9. Feed in 400 Hz (−20 dB) and 17 kHz (−20 dB), then record, rewind and play them back. Adjust Bias VR105 (VR205) for ZX, VR106 (VR206) for SX and VR107 (VR207) for EXII to obtain the same playback levels at 400 Hz (−20 dB) and 17 kHz (−20 dB) on the VTVM. 10. Feed in 400 Hz (0 dB), then record, rewind and play it back. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EXII to obtain 0 dB on the VTVM. 11. Repeat above 9 and 10 two or three times to obtain optimum performance. 12. Set the Dolby NR switch to OFF. 13. Feed in 400 Hz (−20 dB), 10 kHz (−20 dB) and 17 kHz (−20 dB), then record, rewind and play them back. Check to insure that the playback levels are within $-20 \text{ dB} \pm 3 \text{ dB}$ against the levels in Dolby NR C-Type. 14. Set the Dolby NR switch to B-Type. 15. Feed in 10 kHz (−20 dB) and 17 kHz (−20 dB), then record, rewind and play them back. Check to insure that the levels are within $-20 \text{ dB} \pm 2 \text{ dB}$ against the levels in Dolby NR OFF. 16. Check to insure whether the total harmonic distortion is less than 1.0% for ZX and EXII tapes and 1.2% for SX tape. 17. If above is not sufficient, repeat 9 to 16 till satisfactory results are obtained.
11	Overall Frequency Response Adjustment	400 Hz (0 dB) and 20 Hz to 17 kHz (−20 dB) to Input Jacks	VTVM to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. L102, L202	<ol style="list-style-type: none"> 1. Set the BX-150 in Record/Pause mode. 2. Feed in 400 Hz, then set the Input Level control to obtain 0 dB (500 mV) on the VTVM. 3. Decrease the generator output control by 20 dB. 4. Feed in 20 Hz to 17 kHz (−20 dB) and record, rewind and play them back, then check to insure whether the output levels are within $-20 \text{ dB} \pm 4 \text{ dB}$. 5. If above is not sufficient, adjust L102 (L202) to obtain approx. -20 dB on the VTVM, then conduct step 10 "Record Level Calibration and Recording Bias Current Adjustment". 6. If above is not sufficient, precise re-adjustment of step 6 "Playback Frequency Response", replacement of Record/Playback Head or check on item 2.5 "Tape Travelling Check" will be required.
12	Crosstalk Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 μ s Dolby NR SW — OFF MPX SW — OFF		<ol style="list-style-type: none"> 1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037B). 3. Turn the cassette tape the other way round and play it back. 4. Measure the difference between 2 and 3.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
13	Channel Separation Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - OFF MPX SW - OFF		1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and set the Balance control to the extreme left (right). 3. Record, rewind and play it back, then measure the R ch (L ch) level.
14	Erasure Measurement	100 Hz to Input Jacks	100 Hz Band Pass Filter and VTVM to Output Jacks	Same as above		1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037B). 3. Rewind the tape, set the Input Level control to minimum, and then record again. 4. Rewind the tape, play it back, and then measure the difference between 2 and 3.
15	Signal to Noise Ratio Measurement	400 Hz to Input Jacks	IHF-A Curve, Filter, VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW - ZX Eq. SW - 70 μ s Dolby NR SW - B-Type/C-Type MPX SW - OFF		1. Set the Dolby NR switch to B-Type/C-Type. 2. Feed in 400 Hz, then record, rewind and play it back. 3. Adjust the Input Level control to obtain 3% total harmonic distortion in Playback mode. 4. Set the Input Level control to minimum then record again. 5. After rewound, play back and check the output level difference between 3 and 4. Note: The filter of IHF-A curve shall be used in the measurements.
16	Total Harmonic Distortion Measurement	400 Hz to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW - ZX/SX/EX Eq. SW - 70 μ s (ZX/SX) 120 μ s (EX) Dolby NR SW - OFF MPX SW - OFF		1. Adjust the Input Level control to obtain 0 dB on the VTVM. 2. Record, rewind and play it back. 3. Read the distortion meter and check to insure that the distortion is as follows: EXII 1.0% or less SX 1.2% or less ZX 1.0% or less
17	Wow/Flutter Measurement	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Wow/Flutter Meter to Output Jacks	Playback Eq. SW - 70 μ s		Play back and read the wow/flutter meter.

4.2. Playback Frequency Response Adjustment

Figs. 4.1 and 4.2 show the playback amp. circuit for adjustment and the playback equalization curve.

This adjustment will be required if playback level is not sufficient during playing back a 20 kHz PB frequency response tape.

The peaking portion of the equalization curve compensates the gap loss of the playback head. Peaking level is varied by the short circuit of R110 (R210) or R195 (R295).

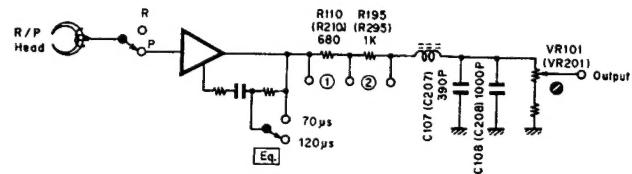


Fig. 4.1

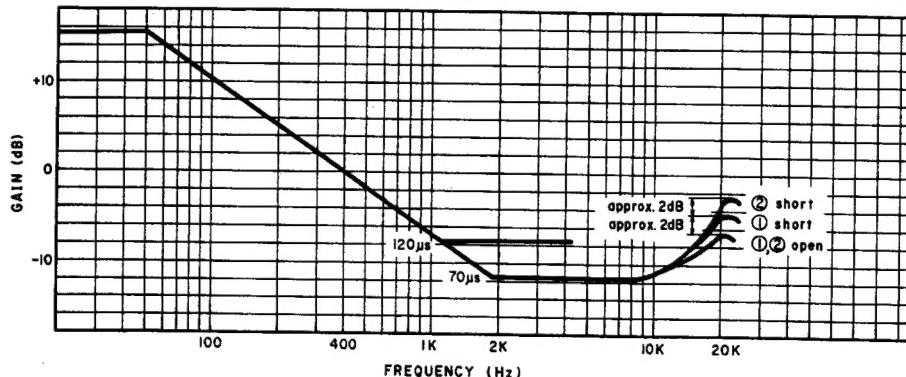


Fig. 4.2

4.3. Dolby NR Circuit Check

Dolby NR circuit incorporates Dolby NR ICs which have no adjustment point. Perform the following checks and make sure that the IC operates accurately, i.e., frequency response through IC is accurate.

4.3.1. Dolby NR B-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C134 (C234) on Main P.C.B. (Positive side is connected to IC101-9 (IC201-9)).

Output Connection: VTVM to test point TP101 (TP201) on Main P.C.B.

Mode: Stop

Dolby NR SW — ON (B-Type)/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Set the Dolby NR switch to B-Type. Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
- (c) Set the Dolby NR switch to OFF. Check to insure that the reading is +3.2 dB ±1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks

Output Connection: VTVM to test point TP101 (TP201) and negative side of C140 (C240) on the Main P.C.B.

Mode: Record/Pause

Dolby NR SW — ON (B-Type)/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Feed in 1.4 kHz and adjust the Input level control to obtain 35 mV/11.1 mV on the VTVM.
- (c) Remove the VTVM from TP101 (TP201) and reconnect it to negative side of C140 (C240).
- (d) Check to insure that the reading at C140 (C240) corresponds to the following with Dolby NR switch OFF and B-Type.

Input Level at TP101 (TP201)	Level at negative side of C140 (C240)	
	Dolby NR OFF	Dolby NR B-Type
35 mV	0 dB	+3.2 dB ±1.5 dB
11.1 mV	0 dB	+8.2 dB ±1.5 dB

4.3.2. Dolby NR C-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C134 (C234) on Main P.C.B. (Positive side is connected to IC101-9 (IC201-9)).

Output Connection: VTVM to test point TP101 (TP201) on Main P.C.B.

Mode: Stop

Dolby NR SW — ON (C-Type)/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Set the Dolby NR switch to C-Type. Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
- (c) Set the Dolby NR switch to OFF. Check to insure that the reading is +6.5 dB ±1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks

Output Connection: VTVM to test point TP101 (TP201) and negative side of C140 (C240) on the Main P.C.B.

Mode: Record/Pause

Dolby NR SW — ON (C-Type)/OFF

- (a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
- (b) Feed in 1.4 kHz and adjust the Input level control to obtain 35 mV/11.1 mV on the VTVM.
- (c) Remove the VTVM from TP101 (TP201) and reconnect it to negative side of C140 (C240).

- (d) Check to insure that the reading at C140 (C240) corresponds to the following with Dolby NR switch OFF and C-Type.

Input Level at TP101 (TP201)	Level at negative side of C140 (C240)	
	Dolby NR OFF	Dolby NR C-Type
35 mV	0 dB	+6.5 dB ±1.5 dB
11.1 mV	0 dB	+11.4 dB ±1.5 dB

5. MECHANISM ASS'Y AND PARTS LIST

5.1. Synthesis

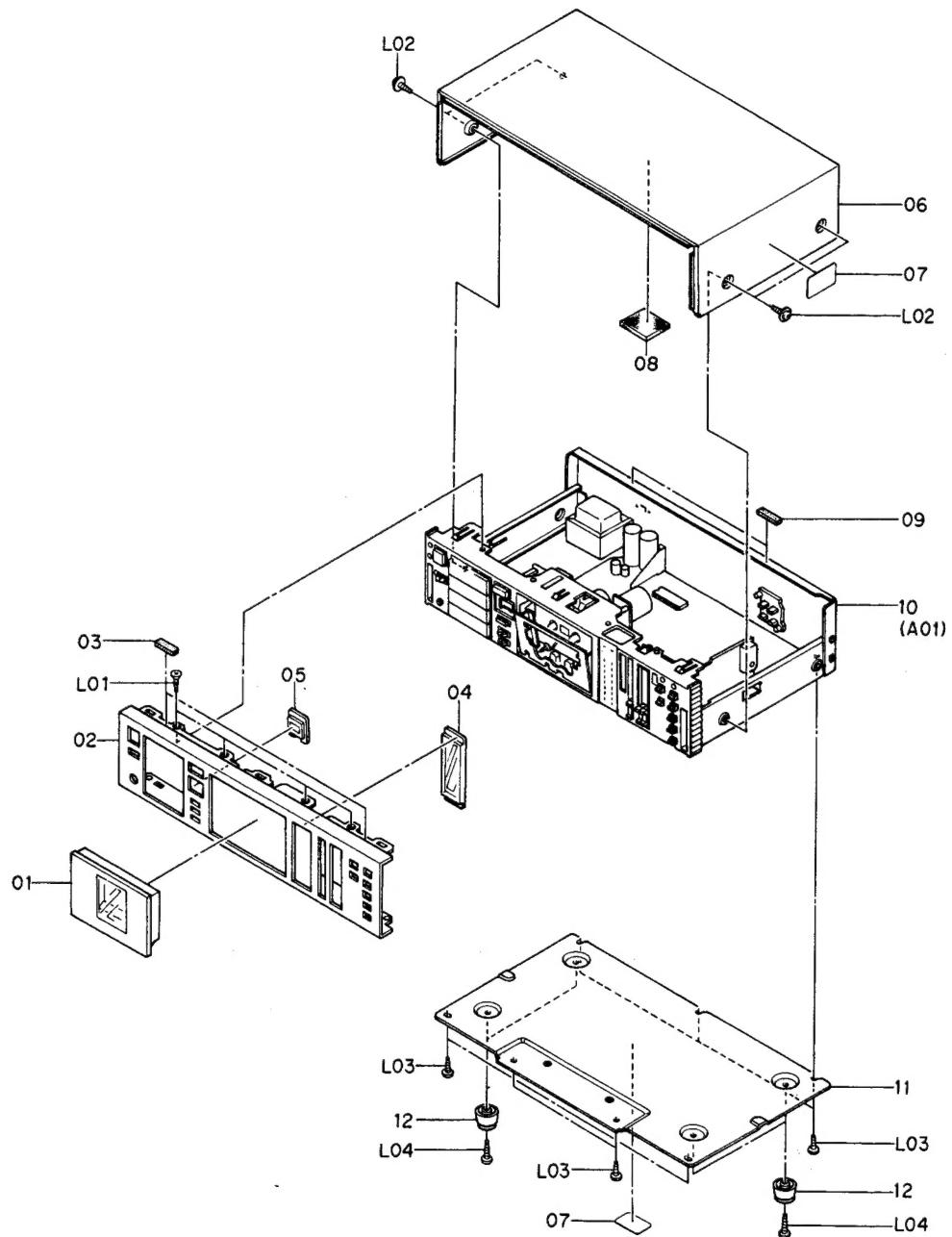


Fig. 5.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis Serial No.: A32001001 - (Silver)				Synthesis Serial No.: A32101001 - (Black)	
01	HA04494A	Cassette Case Cover Ass'y	1	01	HA04495A	Cassette Case Cover Ass'y	1
02	OH04265A	Front Panel BX-150	1	02	OH04266A	Front Panel BX-150	1
	OH04360A	Front Panel BX-150E	1		OH04361A	Front Panel BX-150E	1
03	OJ04628A	Top Cover Cushion (Front)	2	03	OJ04628A	Top Cover Cushion (Front)	2
04	OH04308A	Meter Cover	1	04	OH04308A	Meter Cover	1
05	OH04293A	Counter Cover	1	05	OH04293A	Counter Cover	1
06	OH04155B	Top Cover	1	06	OH04156B	Top Cover	1
07	OM04377A	Caution Label	1	07	OM04377A	Caution Label	1
08	OJ04630A	Top Cover Rubber	1	08	OJ04630A	Top Cover Rubber	1
09	OJ04629A	Top Cover Cushion (Rear)	2	09	OJ04629A	Top Cover Cushion (Rear)	2
10	—	Synthesis Mechanism Ass'y	1	10	—	Synthesis Mechanism Ass'y	1
11	OJ04762A	Bottom Cover	1	11	OJ04762A	Bottom Cover	1
12	OJ03564A	Leg T-H	4	12	OJ03564A	Leg T-H	4
L01	OE03054A	BT 3x8 ⊕ Countersunk	4	L01	OE03054A	BT 3x8 ⊕ Countersunk	4
L02	OE03033A	BT 4x8 ⊕ Pan Washer-Faced	4	L02	OE03033A	BT 4x8 ⊕ Pan Washer-Faced	4
L03	OE00868A	BT 3x8 ⊕ Binding	7	L03	OE00868A	BT 3x8 ⊕ Binding	7
L04	OE00865A	BT 3x10 ⊕ Binding	4	L04	OE00865A	BT 3x10 ⊕ Binding	4

5.2. Synthesis Mechanism Ass'y (A01)

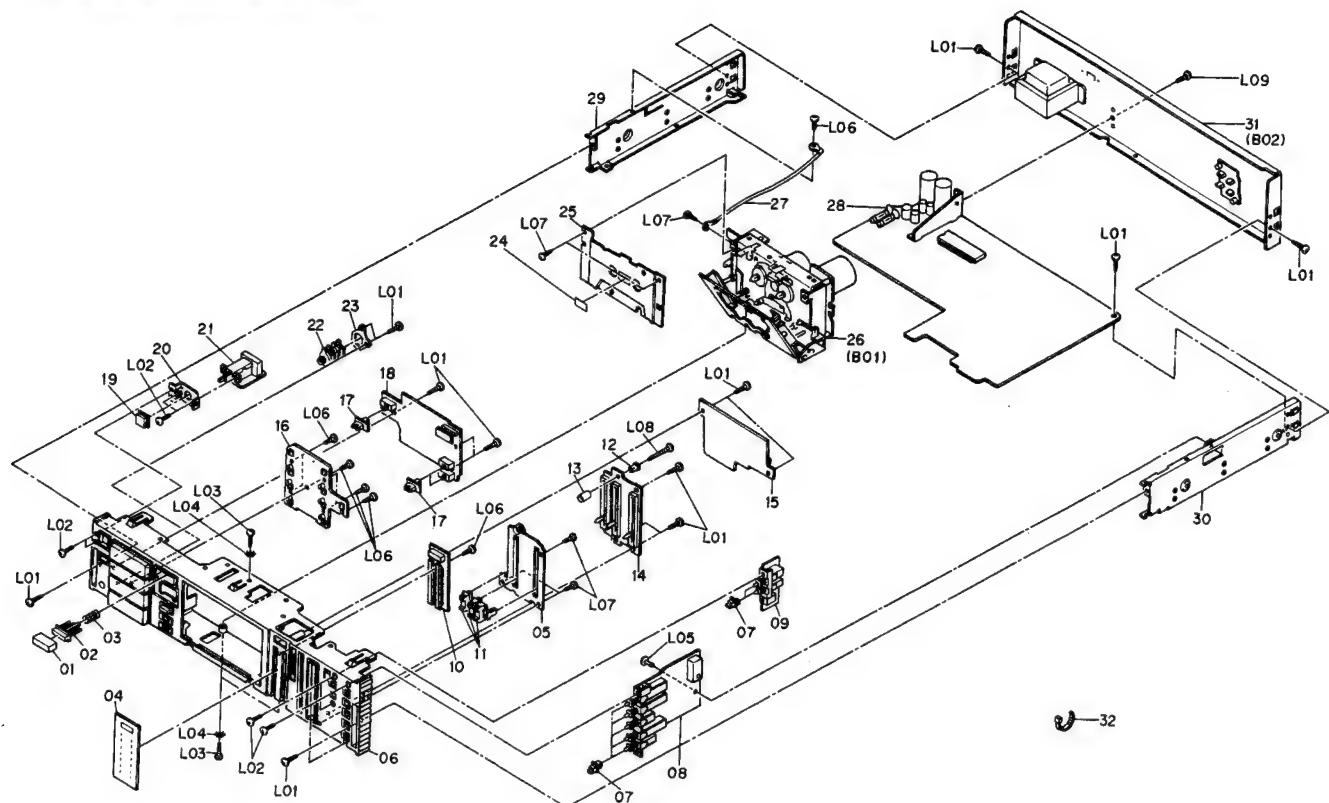


Fig. 5.2

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
A01		Synthesis Mechanism Ass'y Serial No.: A32001001 - (Silver)	1	A01		Synthesis Mechanism Ass'y Serial No.: A32101001 - (Black)	1
01	OH04270A	Eject Button	1	01	OH04269A	Eject Button	1
02	OJ04766A	Button Joint	1	02	OJ04766A	Button Joint	1
03	OJ04765A	Spring	1	03	OJ04765A	Spring	1
04	OH04279A	Meter Scale	1	04	OH04279A	Meter Scale	1
05	OH04285A	Volume Plate	1	05	OH04285A	Volume Plate	1
06	HA04524A	Front Chassis Ass'y	1	06	HA04525A	Front Chassis Ass'y	1
07	OH04288A	Push Switch Button	7	07	OH04248A	Push Switch Button	7
08	BA05100A	Tape Switch P.C.B. Ass'y	1	08	BA05100A	Tape Switch P.C.B. Ass'y	1
09	BA05103A	Dolby NR Switch P.C.B. Ass'y	1	09	BA05103A	Dolby NR Switch P.C.B. Ass'y	1
10	BA05135A	Indicator Ass'y	1	10	BA05135A	Indicator Ass'y	1
11	OH04289A	Volume Knob	3	11	OH04247A	Volume Knob	3
12	OJ04704A	P.C.B. Spacer B	1	12	OJ04704A	P.C.B. Spacer B	1
13	OJ04703A	P.C.B. Spacer A	1	13	OJ04703A	P.C.B. Spacer A	1
14	BA05102A	Volume P.C.B. Ass'y	1	14	BA05102A	Volume P.C.B. Ass'y	1
15	BA05101A	Indicator P.C.B. Ass'y	1	15	BA05101A	Indicator P.C.B. Ass'y	1
16	BA05104A	Control Switch P.C.B. Ass'y	1	16	BA05104A	Control Switch P.C.B. Ass'y	1
17	OH04309A	Slide Switch Knob	3	17	OH04242A	Slide Switch Knob	3
18	BA05105A	Counter P.C.B. Ass'y	1	18	BA05105A	Counter P.C.B. Ass'y	1
19	OH04290A	Power Switch Button	1	19	OH04243A	Power Switch Button	1
20	OJ04763A	Power Switch Holder	1	20	OJ04763A	Power Switch Holder	1
21	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A. & Canada))	1	21	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A. & Canada))	1
	BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia & Others) & BX-150E)	1		BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia & Others) & BX-150E)	1
	BA04825A	Power Switch P.C.B. Ass'y (BX-150 (Japan))	1		BA04825A	Power Switch P.C.B. Ass'y (BX-150 (Japan))	1
22	OB08511A	Headphone Jack	1	22	OB08511A	Headphone Jack	1
23	OJ04611A	Headphone Plate	1	23	OJ04611A	Headphone Plate	1
24	OM04196A	Cassette Label	1	24	OM04196A	Cassette Label	1
25	OH04154B	Cover Plate	1	25	OH04154B	Cover Plate	1
26	CA08498A	Mechanism Ass'y	1	26	CA08498A	Mechanism Ass'y	1
27	BA05131A	Earth Wire	1	27	BA05131A	Earth Wire	1
28	BA05090A	Main P.C.B. Ass'y	1	28	BA05090A	Main P.C.B. Ass'y	1
29	OJ04603E	Side Chassis L	1	29	OJ04603E	Side Chassis L	1
30	OJ04773A	Side Chassis R	1	30	OJ04773A	Side Chassis R	1
31	HA04511A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1	31	HA04517A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04512A	Rear Panel Ass'y BX-150 (Japan)	1		HA04518A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04513A	Rear Panel Ass'y BX-150 (Others)	1		HA04519A	Rear Panel Ass'y BX-150 (Others)	1
	HA04514A	Rear Panel Ass'y BX-150 (Australia)	1		HA04520A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04510A	Rear Panel Ass'y BX-150E (UK)	1		HA04516A	Rear Panel Ass'y BX-150E (UK)	1
	HA04515A	Rear Panel Ass'y BX-150E (220V Class 2)	1		HA04521A	Rear Panel Ass'y BX-150E (220V Class 2)	1
32	OB08515A	Insu-Lock	1	32	OB08515A	Insu-Lock	1
L01	OE00868A	BT 3x8 ⊕ Binding	16	L01	OE00868A	BT 3x8 ⊕ Binding	16
L02	OE00766A	M3x8 ⊕ Binding	6	L02	OE00766A	M3x8 ⊕ Binding	6
L03	OE03074A	BT 2.6x8 ⊕ Binding	2	L03	OE03074A	BT 2.6x8 ⊕ Binding	2
L04	OE00233A	Washer 2.6mm Toothed Lock	2	L04	OE00233A	Washer 2.6mm Toothed Lock	2
L05	OB08583A	Plastic Rivet	1	L05	OB08583A	Plastic Rivet	1
L06	OE00857A	BT 3x6 ⊕ Binding	7	L06	OE00857A	BT 3x6 ⊕ Binding	7
L07	OE00859A	BT 2.6x6 ⊕ Binding	6	L07	OE00859A	BT 2.6x6 ⊕ Binding	6
L08	OE00835A	BT 3x25 ⊕ Pan	1	L08	OE00835A	BT 3x25 ⊕ Pan	1
L09	OE03028A	BT 3x8 ⊕ Binding (Nickel)	1	L09	OE00921A	BT 3x8 ⊕ Binding (Black Chromate)	1

5.3. Mechanism Ass'y (B01)

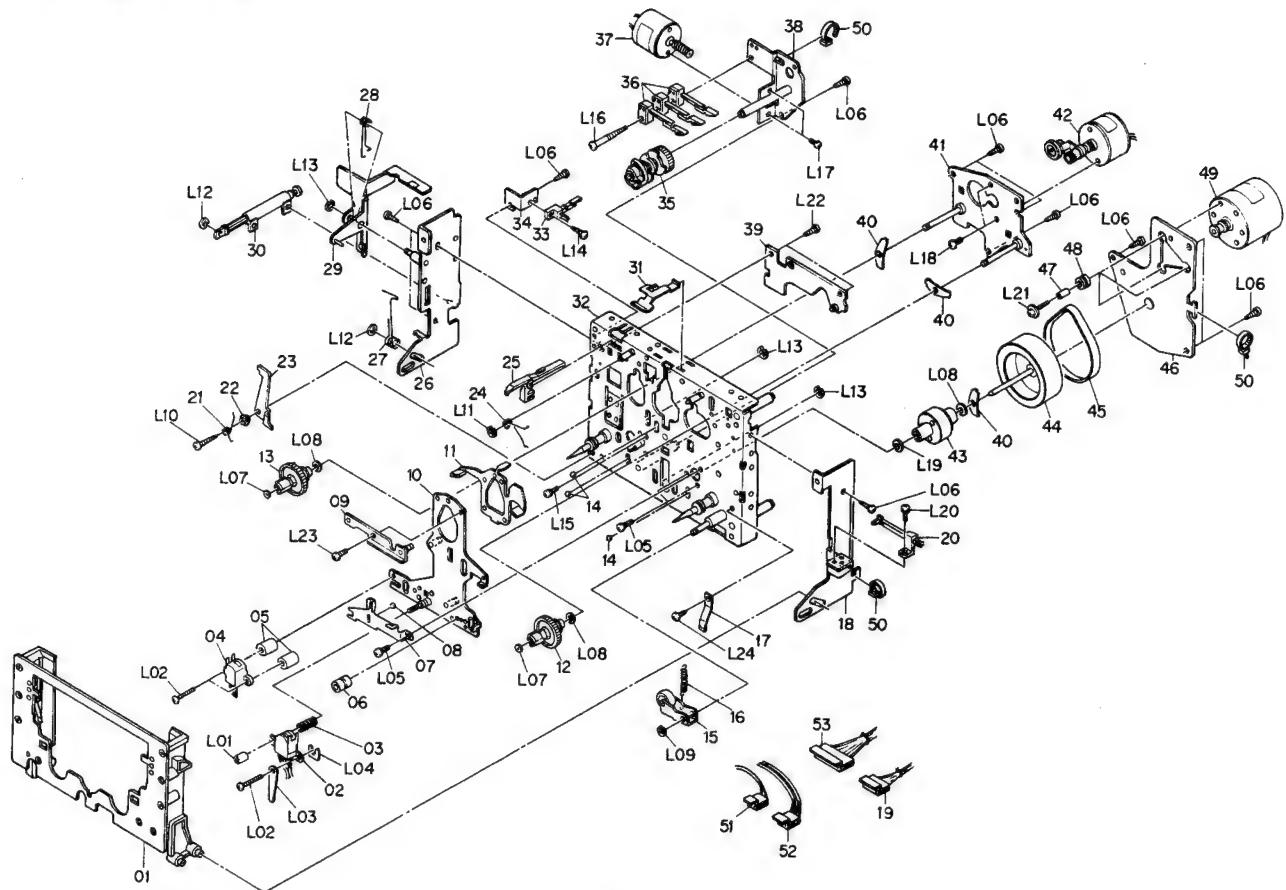


Fig. 5.3

Schematic Ref. No.	Part No.	Description	Qty
B01	CA08498A	Mechanism Ass'y Serial No.: A320.101001 -	1
01	CA80001A	Cassette Case Ass'y	1
02	OG01371A	Record/Playback Head RP-2G	1
03	OC80001A	Azimuth Adjust Spring	1
04	OG01365A	Erase Head E-2D	1
05	OC80044A	Erase Head Collar	2
06	OC80045A	Record/Playback Head Collar	1
07	OC80003A	Head Base Hold Plate	1
08	OC80004A	Steel Ball 30	1
09	OC80005A	Reinforce Plate	1
10	OC80006A	Head Base	1
11	CA80002A	Brake Ass'y	1
12	CA80003B	Take-up Reel Hub Ass'y	1
13	CA80004B	Supply Reel Hub Ass'y	1
14	OC80007A	Steel Ball 20	3
15	CA80005A	Pressure Roller Ass'y	1
16	OC80008A	Pressure Roller Spring	1
17	OC80009A	Cassette Case Spring	1
18	OC80010B	Cassette Case Holder R	1
19	OC80043A	5P-H Connector	1
20	OC80012A	Eject Sensor	1
21	OC80013A	Lock Lever Spring	1
22	OC80014A	Lock Lever Collar	1
23	OC80015B	Lock Lever	1
24	OC80016A	Brake Spring	1
25	OC80017A	Record Protector Lever	1
26	OC80018A	Cassette Case Holder L	1
27	OC80019B	Eject Spring	1
28	OC80020A	Eject Lever Spring	1
29	OC80021A	Eject Lever	1
30	CA80006A	Pneumatic Damper Ass'y	1
31	OC80022B	Cassette Hold Spring	1
32	OC80023A	Mechanism Chassis	1
33	OC80024A	Record Protector	1
34	OC80025A	Record Protector Holder	1
35	OC80026A	Cam	1
36	OC80027A	Mode Switch	3
37	CA80007A	Control Motor Ass'y	1
38	OC80028A	Control Motor Holder	1
39	CA80011A	Shut-off P.C.B. Ass'y	1
40	OC80029A	Back Tension Spring	3
41	OC80030A	Reel Motor Holder	1
42	CA80008B	Reel Motor Ass'y	1
43	OC80031A	Capstan Flange	1
44	OC80033A	Flywheel	1
45	OC80034A	Capstan Belt	1
46	CA80009A	Flywheel Holder Ass'y	1
47	OC80035A	Sleeve	3
48	OC80036A	Floating Rubber	3
49	CA80010A	Capstan Motor Ass'y	1
50	OC80037A	Insu-Lock	3
51	OC80040A	2P-H Connector	1
52	OC80041A	4P-H Connector	1
53	OC80042A	9P-H Connector	1
L01	OC80046A	Azimuth Adjust Screw	1
L02	OE03038A	M2x12 ② Binding	3
L03	OE03053A	Wire Holder	1
L04	OC80048A	Shim 0.03T	(1)
	OC80038A	Shim 0.06T	(1)
	OC80039A	Shim 0.1T	(1)
L05	OE03046A	M2.6x6 ② Pan (2A)	3
L06	OE03042A	FT M2.5x5 ② Pan	12
L07	OE03049A	Washer 1.8mm FT	2
L08	OE03050A	Washer 3.1mm FT	3
L09	OE00222A	E-Ring 2mm	1
L10	OE03043A	FT M2.5x10 ② Pan	1
L11	OE00639A	E-Ring 2.5mm	1
L12	OE03052A	Stopper Ring 2.4mm	2
L13	OE00181A	E-Ring 3mm	3
L14	OE03048A	FT M2.6x6 ② Pan	1
L15	OE03036A	M2x4 ② Pan (2A)	1
L16	OE03044A	FT M2.5x20 ② Pan	1
L17	OE00631A	M2x3 ② Pan	2
L18	OE03045A	M2.6x3 ② Binding	2
L19	OE03051A	Capstan Washer	1
L20	OE03037A	M2x5 ② Pan (2A)	1
L21	OE03047A	M2.6x9 ② Pan	3
L22	OE03041A	FT M2.5x4 ② Pan	2
L23	OE03040A	FT M2.5x3.5 ② Pan	1
L24	OE03035A	M2x3.2 ② Truss	1

5.4. Rear Panel Ass'y (B02)

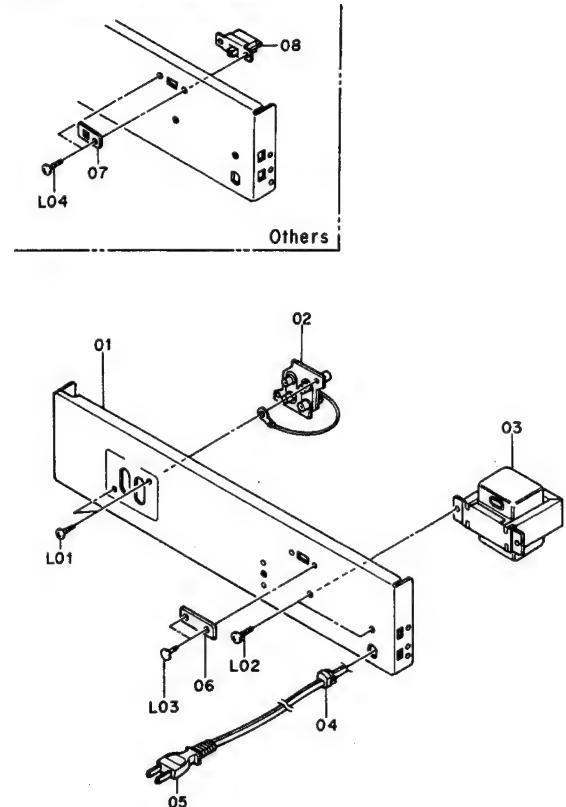


Fig. 5.4

Schematic Ref. No.	Part No.	Description	Q'ty
B02	HA04511A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04512A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04513A	Rear Panel Ass'y BX-150 (Others)	1
	HA04514A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04510A	Rear Panel Ass'y BX-150E (UK)	1
	HA04515A	Rear Panel Ass'y BX-150E (220V Class 2) Serial No.: A32001001 - (Silver)	1
01	OH04300A	Rear Panel BX-150	1
	OH04364A	Rear Panel BX-150E	1
02	OB81001A	4P PIN Jack	1
03	OB50017A	Power Transformer (BX-150 (U.S.A. & Canada))	1
	OB50011A	Power Transformer (BX-150 (Japan))	1
	OB50009A	Power Transformer (BX-150 (Australia) & BX-150E)	1
	OB50010A	Power Transformer (BX-150 (Others))	1
04	OB08037A	Cord Bushing 4P-4 (BX-150 & BX-150E (220V Class 2))	1
	OB08351A	Cord Bushing 4K-4 (BX-150E (UK))	1
05	OB08533A	Power Cord (BX-150 (U.S.A. & Canada & Others))	1
	OB08219B	Power Cord (BX-150 (Japan))	1
	OB08348A	Power Cord (BX-150E (UK))	1
	OB08093U	Power Cord (BX-150E (220V Class 2))	1
06	OB05241A	Power Cord (BX-150 (Australia))	1
	OJ04622B	Switch Cover Gray (BX-150 (U.S.A., Canada, Japan & Australia) & BX-150E)	1
07	OM04407A	Voltage Selector Lock Plate Gray (BX-150 (Others))	1
08	OB07092U	Voltage Selector (BX-150 (Others))	1
L01	OE03028A	BT 3x8 ⊕ Binding (Nickel)	2
L02	OE03024A	BT 4x8 ⊕ Binding (Nickel)	2
L03	OB08583A	Plastic Rivet	2
L04	OE03031A	M3x8 ⊕ Binding (Nickel)	2
B02	HA04517A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04518A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04519A	Rear Panel Ass'y BX-150 (Others)	1
	HA04520A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04516A	Rear Panel Ass'y BX-150E (UK)	1
	HA04521A	Rear Panel Ass'y BX-150E (220V Class 2) Serial No.: A32101001 - (Black)	1
01	OH04301A	Rear Panel BX-150	1
	OH04365A	Rear Panel BX-150E	1
02	OB81001A	4P PIN Jack	1
03	OB50017A	Power Transformer (BX-150 (U.S.A. & Canada))	1
	OB50011A	Power Transformer (BX-150 (Japan))	1
	OB50009A	Power Transformer (BX-150 (Australia) & BX-150E)	1
	OB50010A	Power Transformer (BX-150 (Others))	1
04	OB08037A	Cord Bushing 4P-4 (BX-150 & BX-150E (220V Class 2))	1
	OB08351A	Cord Bushing 4K-4 (BX-150E (UK))	1
05	OB08533A	Power Cord (BX-150 (U.S.A. & Canada & Others))	1
	OB08219B	Power Cord (BX-150 (Japan))	1
	OB08348A	Power Cord (BX-150E (UK))	1
	OB08093U	Power Cord (BX-150E (220V Class 2))	1
06	OB05241A	Power Cord (BX-150 (Australia))	1
	OJ04601B	Switch Cover Black (BX-150 (U.S.A., Canada, Japan & Australia) & BX-150E)	1
07	OM03948A	Voltage Selector Lock Plate Black (BX-150 (Others))	1
08	OB07092U	Voltage Selector (BX-150 (Others))	1
L01	OE00921A	BT 3x8 ⊕ Binding (Black Chromate)	2
L02	OE00915A	BT 4x8 ⊕ Binding (Black Chromate)	2
L03	OB08583A	Plastic Rivet	2
L04	OE00818A	M3x8 ⊕ Binding (Black Chromate)	2

6. MOUNTING DIAGRAMS AND PARTS LIST

Notes:

1. Mounting diagram shows a dip side view of the printed circuit board.
2. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
3. Following transistors are interchangeable with each other.
 - a. 2SA733, 2SA608SP, 2SA1048, 2SA1175
 - b. 2SC945, 2SC536SP, 2SC2458, 2SC2785
4. Abbreviation for part name:
TR — Transistor, **SiD** — Silicon Diode, **GD** — Germanium Diode, **ZD** — Zener Diode
RK — Carbon Resistor, **RM** — Metal Film Resistor, **RF** — Fail Safe Type Resistor, **RC** — Cement Resistor, **RW** — Wire Wound Resistor
CE — Electrolytic Capacitor, **CM** — Mylar Capacitor, **CC** — Ceramic Capacitor, **CP** — PP Capacitor, **CT** — Tantalum Capacitor, **CF** — Film Capacitor, **C** — Mica Capacitor

6.1. Power Switch P.C.B. Ass'y

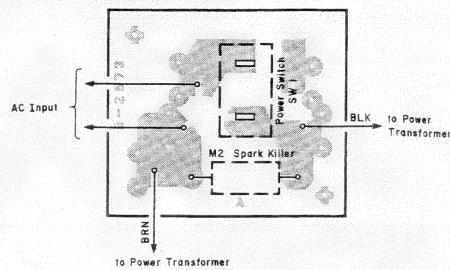


Fig. 6.1

6.4. Volume P.C.B. Ass'y

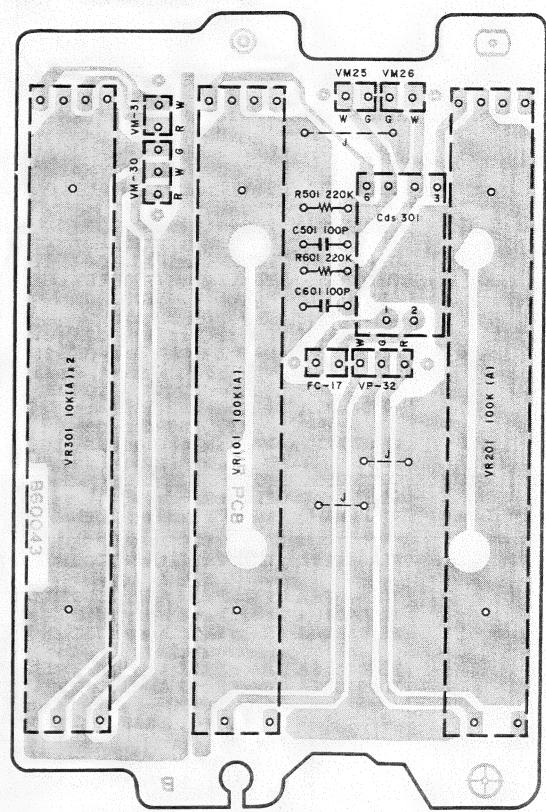


Fig. 6.4

6.2. Dolby NR Switch P.C.B. Ass'y

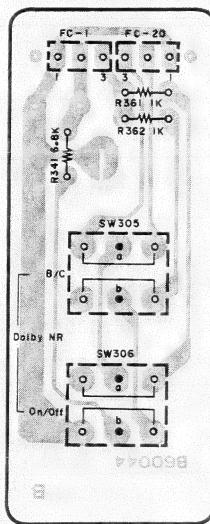


Fig. 6.2

6.3. Shut-off P.C.B. Ass'y

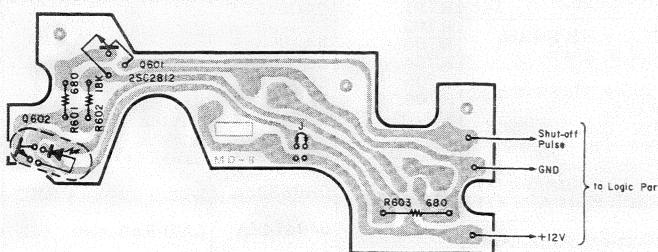


Fig. 6.3

6.5. Control Switch P.C.B. Ass'y

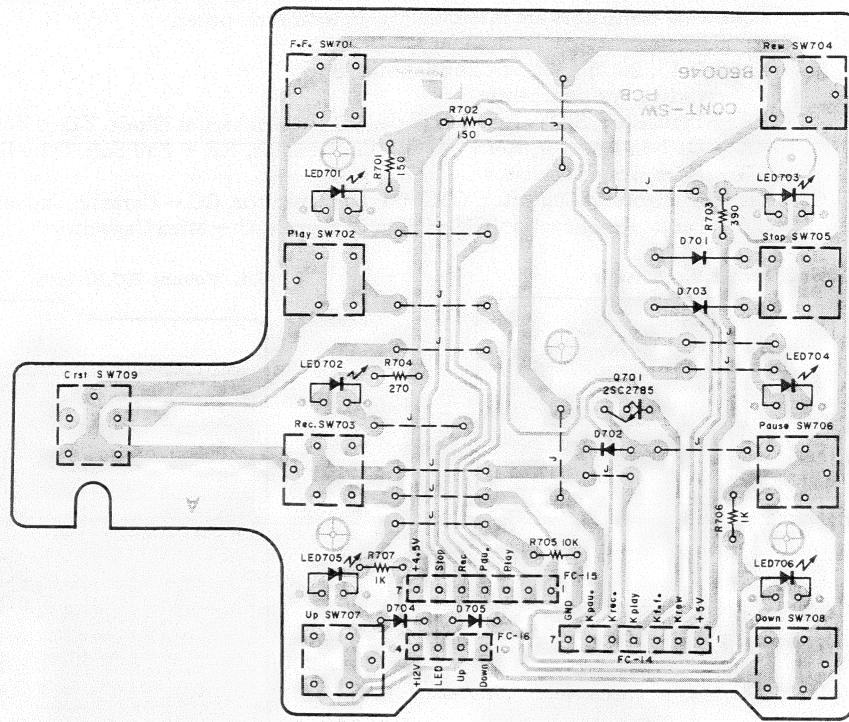


Fig. 6.5

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
SW1 M2 M2 M2	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A., Canada & Others))	VR101,201 VR301 R501,601 C501,601 Cds301	BA05102A	Volume P.C.B. Ass'y
	BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia) & BX-150E)		0B60043B 0B31002A	Volume P.C.B. Slide Volume 100K (A)
	BA04825A	Power Switch P.C.B. Ass'y (BX-150 (Japan))		0B31001A	Slide Volume 10K (A)x2
	0B02573D	Power Switch P.C.B.		0B09733A	RK 220K 1/6W J
	0B70002A	Power Switch		0B09282A	CC 100P 50V K
	0B08363A	Spark Killer (BX-150 (Japan))		0B06325B	Photocoupler
	0B08342A	Spark Killer (BX-150 (U.S.A., Canada & Others))		0B81011A	MCD7214F
	0B08955A	Spark Killer (BX-150 (Australia) & BX-150E)		0B81012A	Dip Mate 4P (1)
	0E00752A	Eyelet 2x3 (2)		BA05104A	Dip Mate 5P (2)
	BA05103A	Dolby NR Switch P.C.B. Ass'y	Q701 D701,702 703,704 705 R701 R702 R703 R704 R705 R706,707 SW701-709	0B60046A 0B06456A 0B06398A	Control Switch P.C.B. Ass'y
R341 R361,362	0B60044B	Dolby NR Switch P.C.B.		0B05795A	Control Switch P.C.B.
	0B09697A	RK 6.8K 1/6W J		0B09657A	TR 2SC2785
	0B09677A	RK 1K 1/6W J		0B09667A	SiD 1SS176
	0B70009A	Push Switch (1)		0B09663A	RK 270 1/6W J
	0B02351A	6P JP Connector(1)		0B09701A	RK 10K 1/6W J
	0J04768A	Earth Plate A (1)		0B09677A	RK 1K 1/6W J
	CA80011A	Shut-off P.C.B. Ass'y		0B70004A	Toutch Switch 4.3mm
Q601 Q602	0C80047A	Shut-off P.C.B.	LED701 702,703 LED704 705,706	0B06334A	LED TLG124A GRN
	0B06388A	TR 2SC2812		0B06333A	LED TLR124A RED
R601,603 R602	0B06389A	Photo Reflector NJL5141		0J04744A	LED Reflector (6)
	0B09840A	RK 680 Leadless			
	0B09841A	RK 18K Leadless			

6.6. Counter P.C.B. Ass'y

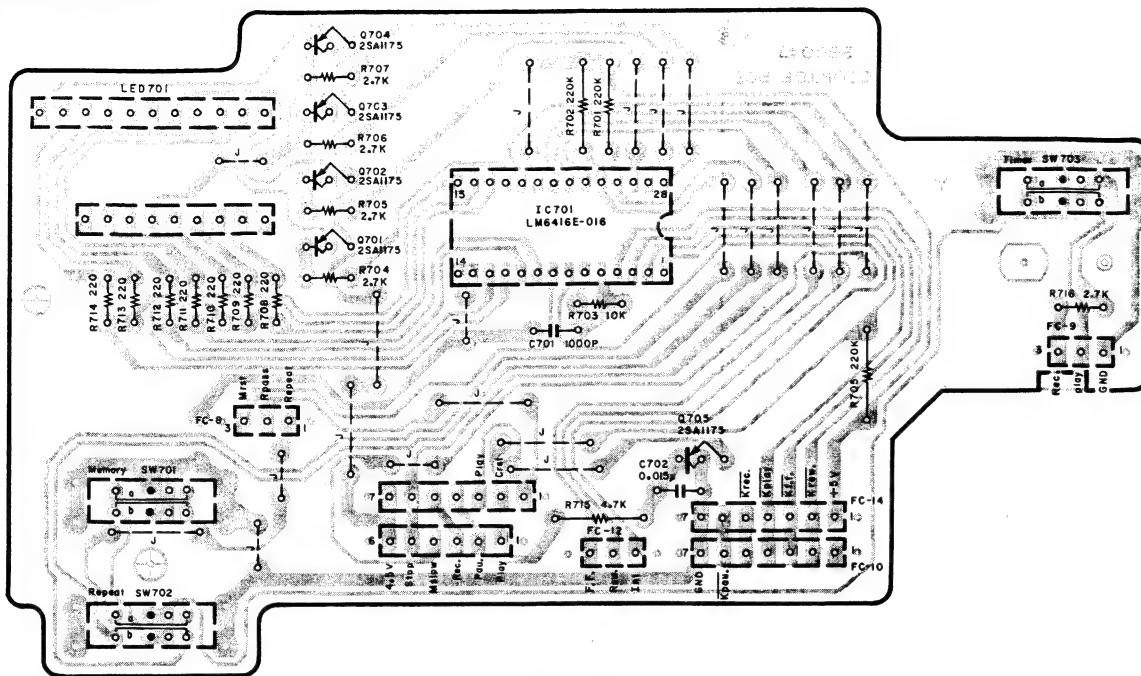


Fig. 6.6

6.7. Tape Switch P.C.B. Ass'y

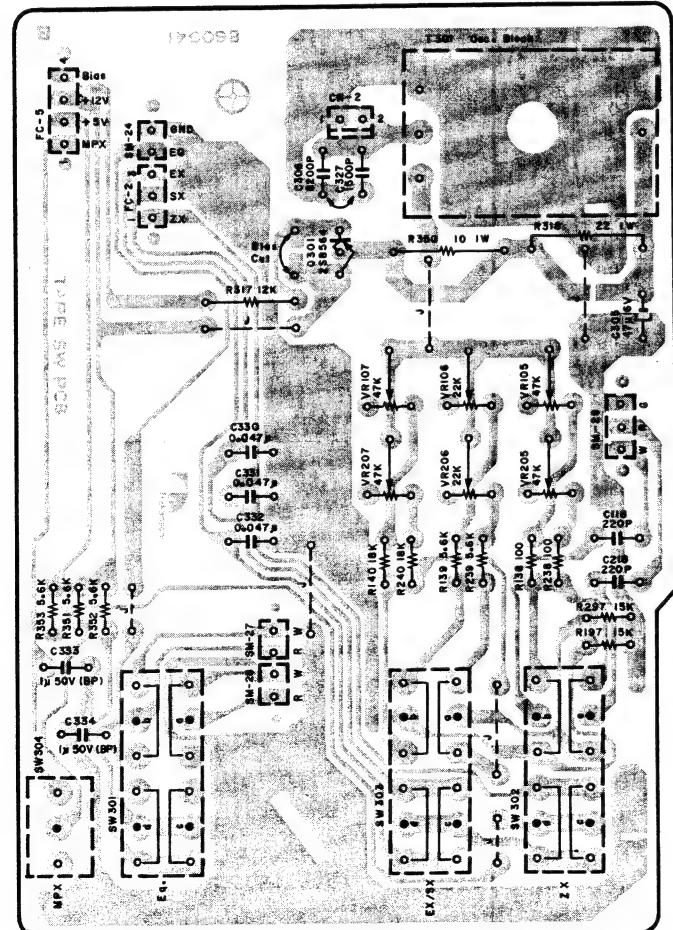


Fig. 6.7

6.8. Indicator P.C.B. Ass

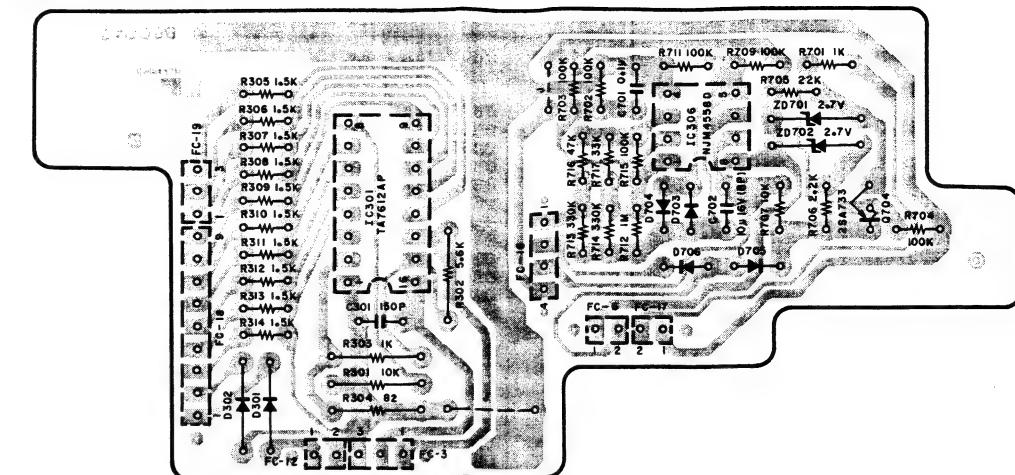


Fig. 6.8

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05105A	Counter P.C.B. Ass'y		BA05101A	Indicator P.C.B. Ass'y
IC701 Q701,702 703,704 705	OB60047A OB06368A OB06455A	Counter P.C.B. IC LM6416E-106 TR 2SA1175	IC301 IC306 Q704 ZD701,702	OB60042B OB06369A OB11031A OB06013A OB06191A	Indicator P.C.B. IC TA7612AP IC NJM4558D TR 2SA733 (P,Q) ZD 2.7V RD2.7EB
LED701 R701,702 705	OB12098A OB05625A	Counter LED RK 220K 1/4W J	D301,302 703,704 705,706	OB06398A	SID 1SS176
R703 R704,705 706,707 716	OB09701A OB09687A	RK 10K 1/6W J RK 2.7K 1/6W J	R301 R302 R303 R304 R305-314	OB01888A OB01887A OB01857A OB05631A OB09681A	RK 10K 1/4W J RK 5.6K 1/4W J RK 1K 1/4W J RK 82 1/4W J RK 1.5K 1/6W J
R708-714	OB09661A	RK 220 1/6W J (7)			(10)
R715 C701 C702 SW701,702 SW703	OB01846A OB09282A OB05557A OB70010A OB07437A OB81016A OB81017A OJ04786A	RK 4.7K 1/4W J CC 100P 50V K CM 0.015 μ 50V J Slide Switch 2-2 Slide Switch 2-3 IC Socket 9P (1) IC Socket 11P (1) Counter Himelon (1)	R701 R702,703 704,709 711,715 R705 R706 R707 R712 R713,714	OB09677A OB09725A	RK 1K 1/6W J RK 100K 1/6W J
	BA05100A	Tape Switch P.C.B. Ass'y			
Q301 T301 VR105,107 205,207	OB60041B OB06332A OB06688C OB32010A	Tape Switch P.C.B. TR 2SB564M Bias Osc. Unit Semi-fixed VR 47K	C301 C701 C702	OB09709A OB09685A OB09701A OB09749A OB09737A OB09717A OB09713A OB09281A OB09868A OB09163A OB02349A OB02356A	RK 22K 1/6W J RK 2.2K 1/6W J RK 10K 1/6W J RK 1M 1/6W J RK 330K 1/6W J RK 47K 1/6W J RK 33K 1/6W J CC 150P 50V K CF 0.1 μ 50V J CE 10 μ 16V (BP) JP Connector 4P (1) JP Connector 12P (1)
VR106,206 R138,238 R139,239 351,352 353	OB32009A OB09653A OB09695A OB32010A	Semi-fixed VR 22K RK 100 1/6W J RK 5.6K 1/6W J		OB81011A OB81012A	Dip Mate 4P (1) Dip Mate 5P (1)
R140,240 R197,297	OB09707A OB09705A	RK 18K 1/6W J RK 15K 1/6W J			
R317	OB09263A	RK 12K 1/4W J			
R318	OB09831A	RF 22 1W J			
R350	OB09837A	RF 10 1W J			
C118,218	OB09283A	CC 220P 50V K			
C305	OB01403A	CE 47 μ 16V			
C306	OB09828A	CP 8200P 100V J			
C327	OB41229A	CP 1500P 100V J			
C330,331 332	OB05796A	CM 0.047 μ 50V J			
C333,334 CN2	OB09187A OB81051A OB70005A OB81010A OB81011A OB81012A OJ04768A	CE 1 μ 50V (BP) 2P-S Post Push Switch (1) Dip Mate 3P (1) Dip Mate 4P (2) Dip Mate 5P (1) Earth Plate A (1)			

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05090A	Main P.C.B. Ass'y	R354,355 356,363 364	OB09725A	RK 100K 1/6W J	VR108,208	OB32011A	Semi-fixed VR 100K	R634,635	OB09677A	RK 1K 1/6W J
	— PB Eq. Amp. —					R141,241	OB09713A	RK 33K 1/6W J	638,639		
Q101,102	OB06142A	TR 2SC2240 (BL)	C119,219	OB05571A	CM 680P 50V J	R142,242	OB01889A	RK 100K 1/4W J	658		
201,202			C120,220	OB05843A	CM 0.012μ 50V J	R143,243	OB09743A	RK 560K 1/6W J	R641,650	OB01889A	RK 100K 1/4W J
Q103,203	OB01872A	TR 2SC945L (P,Q)	C121,221	OB05659A	CM 5600P 50V J	R144,244	OB09729A	RK 150K 1/6W J	R642	OB09717A	RK 47K 1/6W J
ZD301	OB12009A	ZD 10V RD10JB2T	C122,222	OB09993A	CM 820P 50V J	R145,246	OB09725A	RK 100K 1/6W J	R643	OB01846A	RK 4.7K 1/4W J
D304	OB01909A	SID 1S1555	C123,223	OB01913A	CM 1800P 50V J	R147,148	OB09719A	RK 56K 1/6W J	R645,646	OB09733A	RK 220K 1/6W J
L101,201	OB03919B	Inductor 36mH		— Dolby NR —		R147,248			R648,649	OB05629A	RK 2.7K 1/4W J
VR101,201	OB32009A	Semi-fixed VR 22K				R149,249	OB09709A	RK 22K 1/6W J	R652	OB09705A	RK 15K 1/6W J
R101,201	OB09741A	RK 470K 1/6W J	IC101,201	OB06383A	IC TEA0654	C124,224	OB09570A	CE 0.15μ 50V (LN)	R653	OB09693A	RK 4.7K 1/6W J
R102,203	OB09330A	RK 100K 1/4W J (Noiseless)	Q110,111	OB06382A	IC TEA0652	C125,225	OB09148A	CE 10μ 25V (LN)	R654,655	OB09803A	R-Netw 47Kx5
202,203				OB01872A	TR 2SC945L (P,Q)	C308	OB01400A	CE 100μ 16V	R656	OB09824A	R-Netw 100Kx3
R104,204	OB05631A	RK 82 1/4W J	210,211						R657	OB09681A	RK 1.5K 1/6W J
R105,205	OB09731A	RK 180K 1/6W J	ZD102,202	OB06167A	ZD 6.2V RD6.2EB3				C601	OB40079A	CE 220μ 16V
R106,206	OB09685A	RK 2.2K 1/6W J	L104,204	OB06691A	L-C Block YEL	IC304	OB06370A	IC 4556D	C602,604	OB40024A	CE 0.33μ 50V
R107,207	OB09711A	RK 27K 1/6W J	L105,205	OB06690A	L-C Block BLUE	C108,208	OB06299A	TR 2SC2878	C603,606	OB01802A	CM 2200P 50V J
R108,208	OB09830A	RM 4.87K 1/4W F	R154,193	OB05671A	RK 2.2M 1/4W J	R165,265	OB09685A	RK 2.2K 1/6W J	C607	OB09290A	CC 0.01μ 50V Z
R109,209	OB09829A	RM 3.32K 1/4W F	254,293			R166,266	OB09697A	RK 6.8K 1/6W J	C608	OB09222A	CE 0.47μ 50V (LN)
R110,210	OB09673A	RK 680 1/6W J	R173,273	OB09687A	RK 2.7K 1/6W J	R167,168	OB09725A	RK 100K 1/6W J	C609	OB09817A	CE 33μ 10V (LN)
R111,211	OB01888A	RK 10K 1/4W J	R174,274	OB09688A	RM 3K 1/6W J	R167,268			C611	OB02243A	5P-T Post (1)
R112,212	OB09703A	RK 12K 1/6W J	R175,275	OB09686A	RM 2.4K 1/6W J	R170,270	OB05579A	RK 22 1/4W J	C604	OB02245A	9P-T Post (1)
R195,295	OB09677A	RK 1K 1/6W J	R176,276	OB22286A	RM 3.30K 1/6W F	R171,199	OB09677A	RK 1K 1/6W J			
R319	OB01857A	RK 1K 1/4W J	R178,278	OB22229A	RM 1.00K 1/6W F	R171,299					
R357	OB09725A	RK 100K 1/6W J	R180,280	OB09721A	RM 68K 1/6W J						
C102,202	OB09137A	CE 22μ 25V (LN)	R181,281	OB22309A	RM 5.10K 1/6W F	R342	OB09049A	RF 22 1/4W J	C603,606	OB40024A	CE 0.33μ 50V
C103,203	OB09283A	CC 220P 50V K	R182,282	OB22265A	RM 2.20K 1/6W F	C130,230	OB09327A	CE 0.33μ 50V (LN)	IC402	OB06380A	IC NJM7812
C104,204	OB01403A	CE 47μ 16V	R184,284	OB22305A	RM 4.70K 1/6W F	C131,231	OB01398A	CE 220μ 16V	Q401,405	OB06322A	TR 2SC2002 (K,L)
C105,205	OB01863A	CE 3.3μ 50V	R185,285	OB09717A	RK 47K 1/6W J	C170,270	OB09291A	CC 0.022μ 50V Z	Q402,403	OB01872A	TR 2SC945L (P,Q)
C106,206	OB05832A	CM 0.018μ 50V J	R186,286	OB09722A	RK 75K 1/6W J	C323	OB01400A	CE 100μ 16V	404	ZD401	OB06167A ZD 6.2V RD6.2EB3
C107,207	OB41002A	CP 390P 100V J	R187,190	OB09737A	RK 330K 1/6W J				ZD402	OB12003A	ZD 5.6V RD5.6JB2T
C108,208	OB05550A	CM 1000P 50V J	287,290						D401	OB06282A	Diode Bridge DBA10
C304	OB09868A	CF 0.1μ 50V J	R188,189	OB09739A	RK 390K 1/6W J				D402	OB12100A	Double SID MC921
C307	OB01400A	CE 100μ 16V	288,289						C403	OB06398A	SID 1SS176
RL301	OB90011A	DS Relay	R191,291	OB09796A	RM 12K 1/4W F	IC601	OB06178A	IC μPD4011BC	R404	OB01857A	RK 1K 1/4W J
CN1	OB02242A	4P-T Post	R192,194	OB09790A	RM 22K 1/6W J	IC602	OB06214A	IC μPD4071BC	R405	OB09671A	RK 560 1/6W J
	— Rec. Eq. Amp. —		R196,294	OB09723A	RK 82K 1/6W J	Q601	OB06332A	TR 2SB564M	R406	OB24007A	RF 22 2W J
IC303	OB06387A	IC NJM2043DD	R340	OB09330A	RK 100K 1/4W J	Q602,604	OB01872A	TR 2SC945L (P,Q)	R407	OB09725A	RK 100K 1/6W J
Q104,204	OB06299A	TR 2SC2878	R702,802	OB01679A	RK 100K 1/6W J	606,621			R408	OB09707A	RK 18K 1/6W J
L102,202	OB00068A	Trap Coil 10.5mH	C132,134	OB40185A	CE 1μ 50V	623,625			R409	OB09695A	RK 5.6K 1/6W J
L103,203	OB06696A	L-C Block	232,234			616,617			R410	OB09665A	RK 330 1/6W J
R113,213	OB09711A	RK 27K 1/6W J	C135,235	OB09812A	CP 0.01μ 100V G	618,619			R411	OB09693A	RK 4.7K 1/6W J
R114,214	OB09701A	RK 10K 1/6W J	C136,236	OB09240A	CP 0.033μ 100V G	Q607,624	OB10021A	TR 2SD1164 (K,L)	R413	OB09713A	RK 33K 1/6W J
R115,116	OB09725A	RK 100K 1/6W J	C137,237	OB05652A	CM 4700P 50V J	Q608,609	OB06372A	TR 2SA953 (K,L)	R414	OB09719A	RK 56K 1/6W J
117,215			C138,140	OB01412A	CE 10μ 16V	610,611			R415	OB24023A	R Fuse 1
216,217			154,238			612,613	OB06322A	TR 2SC2002 (K,L)	C402	OB40095A	CE 1000μ 25V
R118,218	OB09677A	RK 1K 1/6W J	240,254			614,615			C403	OB01392A	CE 470μ 16V
R119,219	OB09731A	RK 180K 1/6W J	321			Q620	OB06066A	TR 2SD471(L,M)	C404	OB1403A	CE 47μ 16V
R120,220	OB09691A										

6.9. Main P.C.B. Ass'y

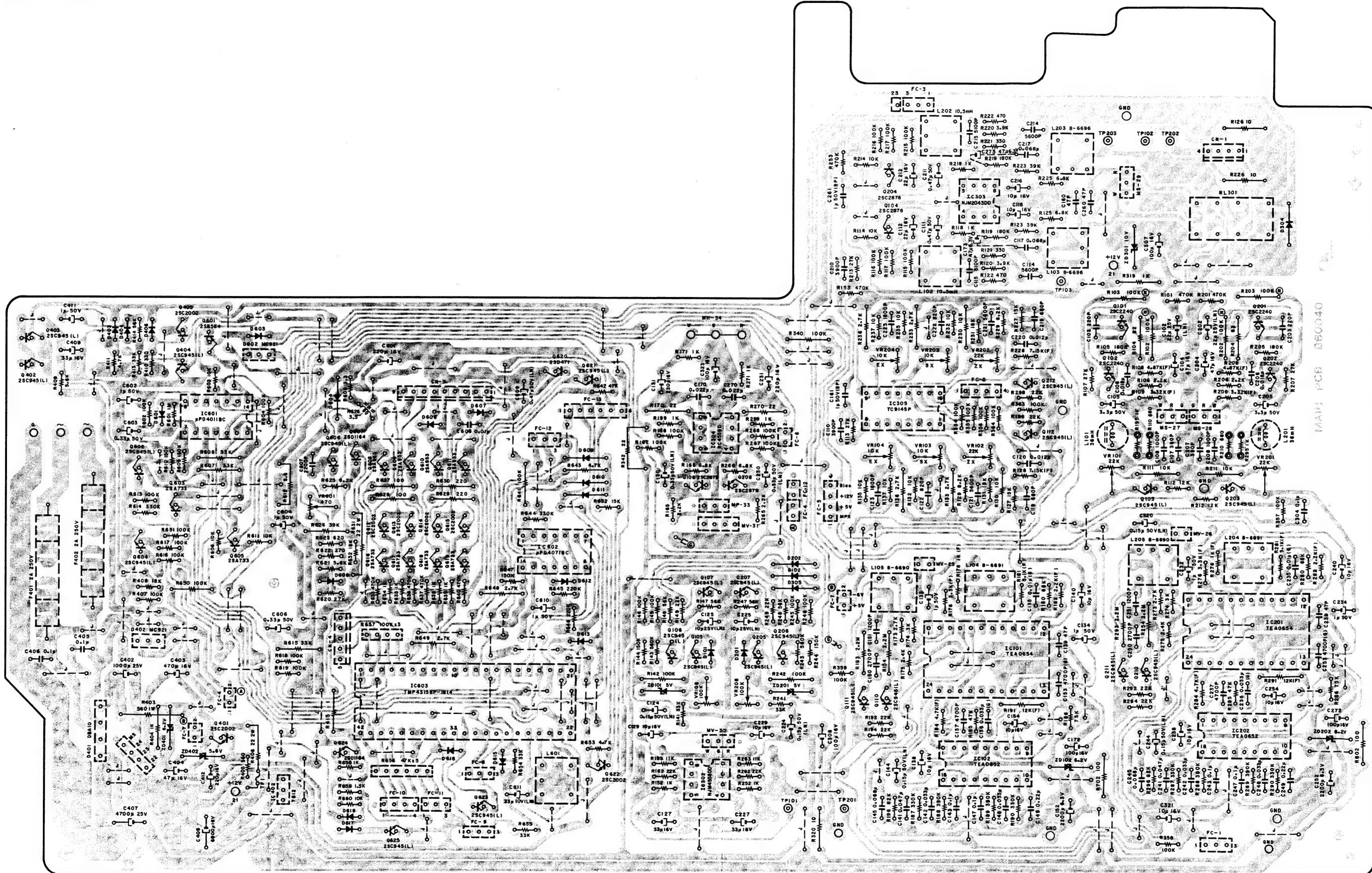
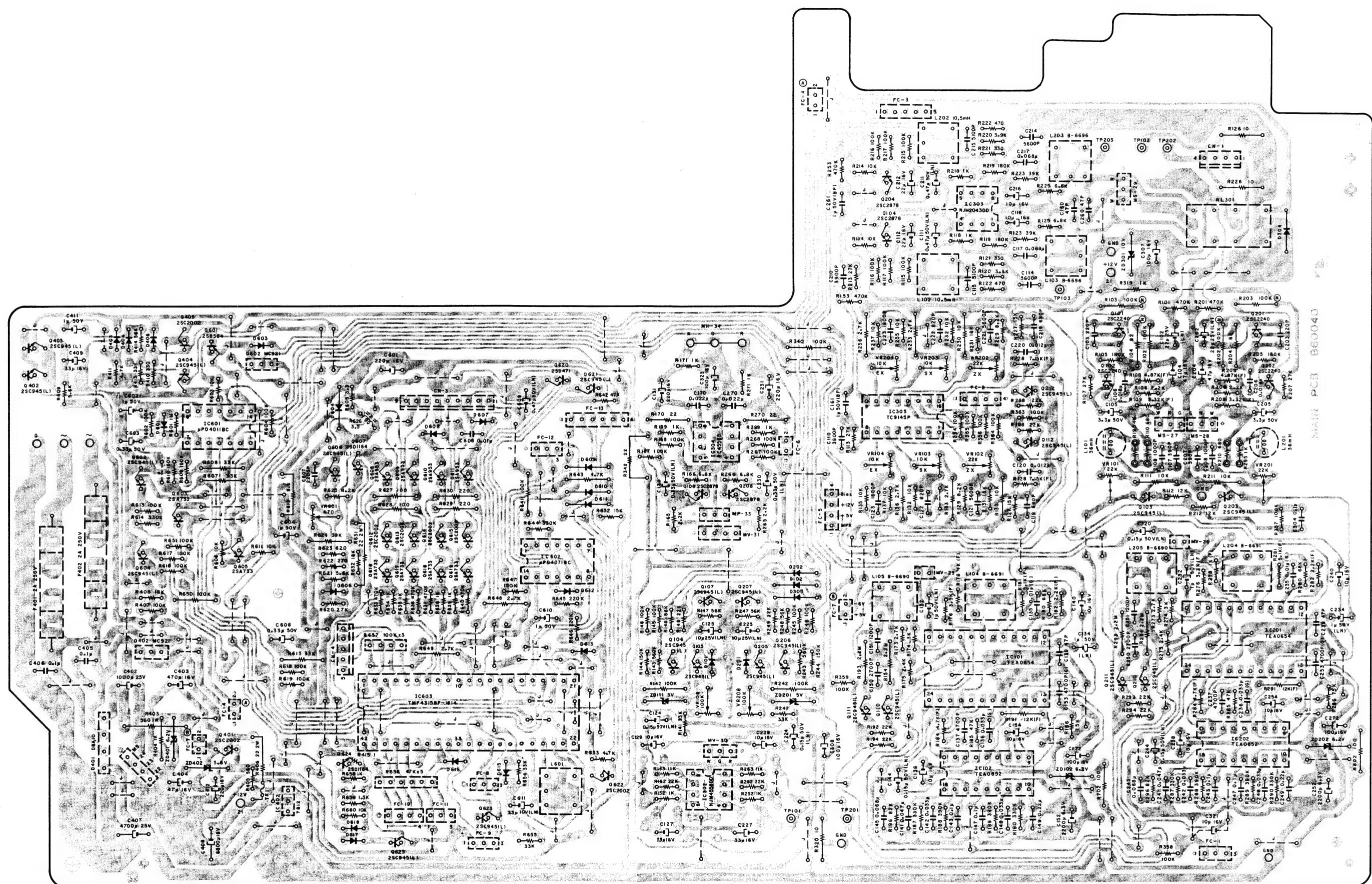


Fig. 6.9.1 2nd Version



7. SCHEMATIC DIAGRAMS

7.1. Attention to Servicemen

(1) Caution

- (a) If a part is in need of removing (or replacing) for service, it should be remounted (or replaced with specified parts) by the same methods as before after servicing.
- (b) The appliance should be used only specified parts for preventing a risk of fire and electric shock and maintaining the characteristics.
- (c) Before returning the repaired appliance to a customer, check to insure that the exposed part is accurately insulated from the Power Supply by measuring the leakage current or the insulation resistance between them.

(2) Parts Replacement

Following parts shall be replaced with the specified ones.
Refer to the parts list.

(a) Power Supply Circuit

Power Cord
Power Transformer: T1
Fuses: F401, 402

(b) Power Switch P.C.B. Ass'y

Power Switch: SW1
Spark Killer: M2

(c) Tape Switch P.C.B. Ass'y

Power Transistor: Q301
Fail Safe Type Resistor: R318, 350

(d) Main P.C.B. Ass'y

Regulator IC: IC402
Power Transistors: Q601, 607, 620, 624
Diode Bridge: D401
Fail Safe Type Resistors: R320, 342, 403, 406, 612, 631
Thermal Fuse: TF1

7.2. IC Block Diagrams

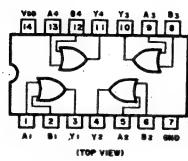


Fig. 7.2.1. OR Gate C-MOS IC μ PD4071BC

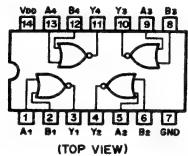


Fig. 7.2.2 NAND Gate C-MOS IC μ PD4011BC

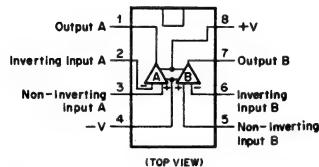


Fig. 7.2.3 Operational Amp. IC4558DD, 4556D, NJM4558D, NJM2043DD

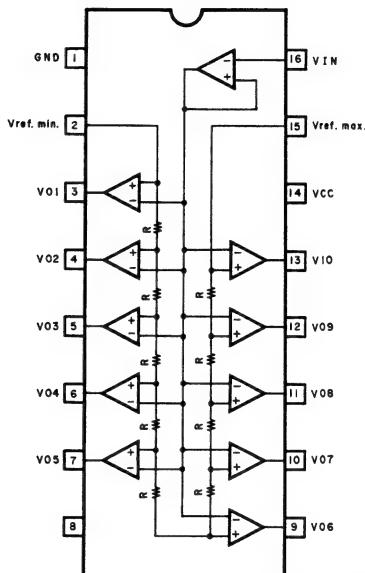


Fig. 7.2.4 Level Meter Driver TA7612AP

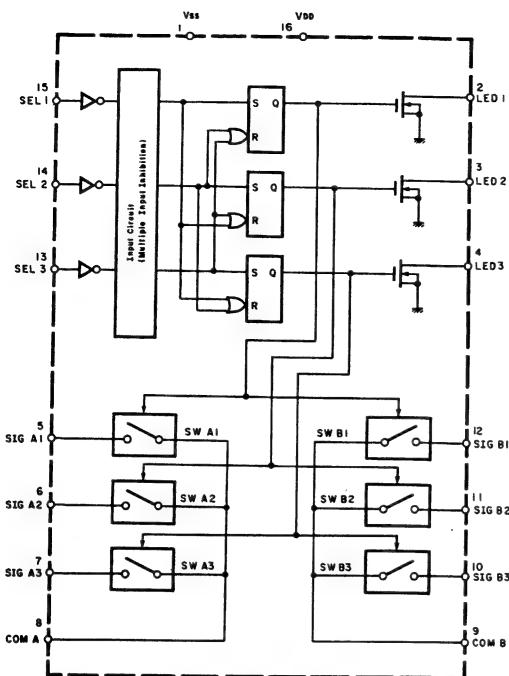


Fig. 7.2.5 Analog Switch Selector TC9145P

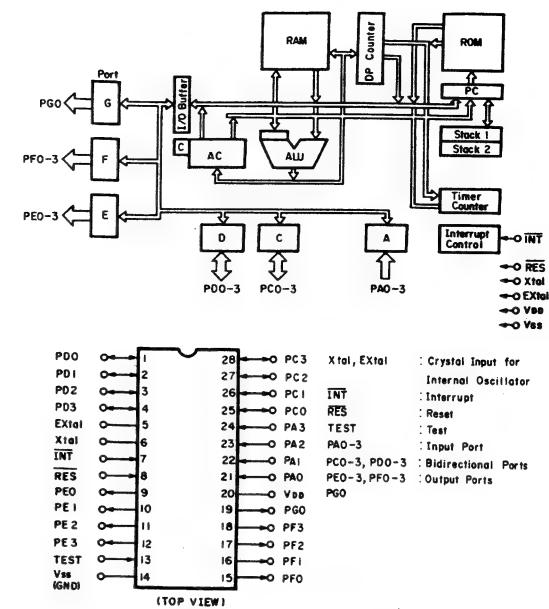


Fig. 7.2.6 4-Bit Micro-processor LM6416E-106

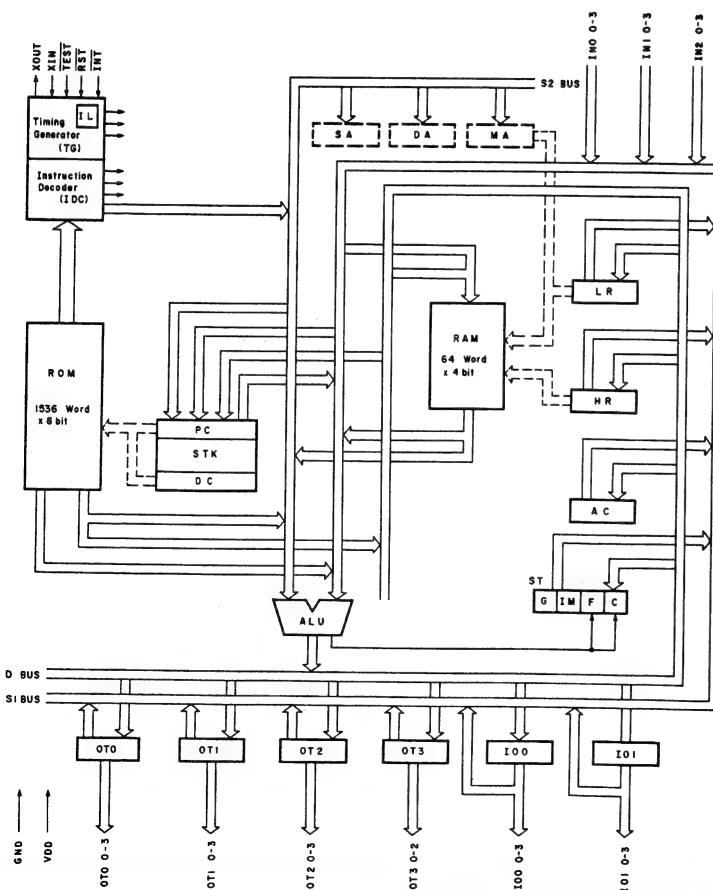
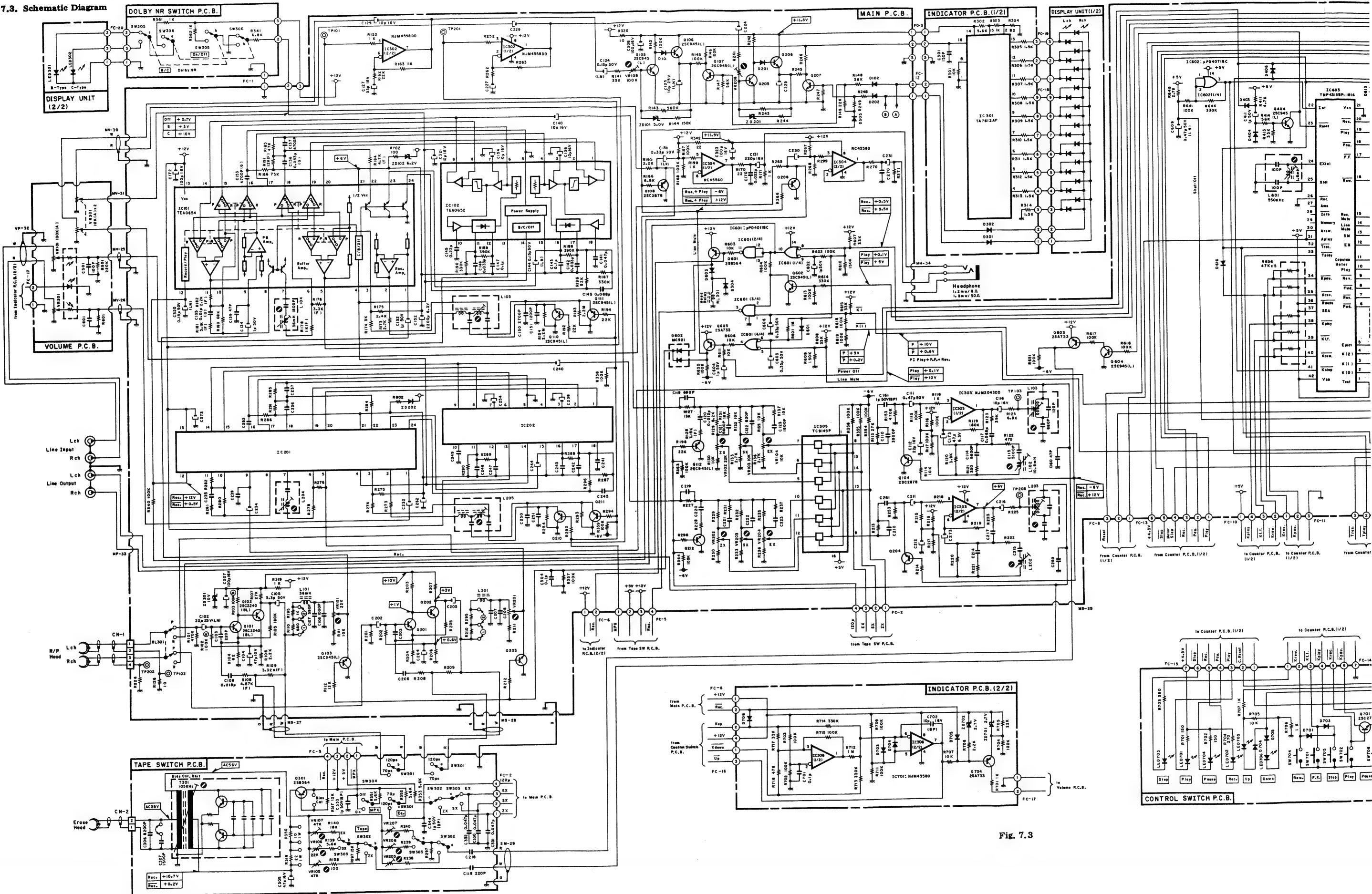
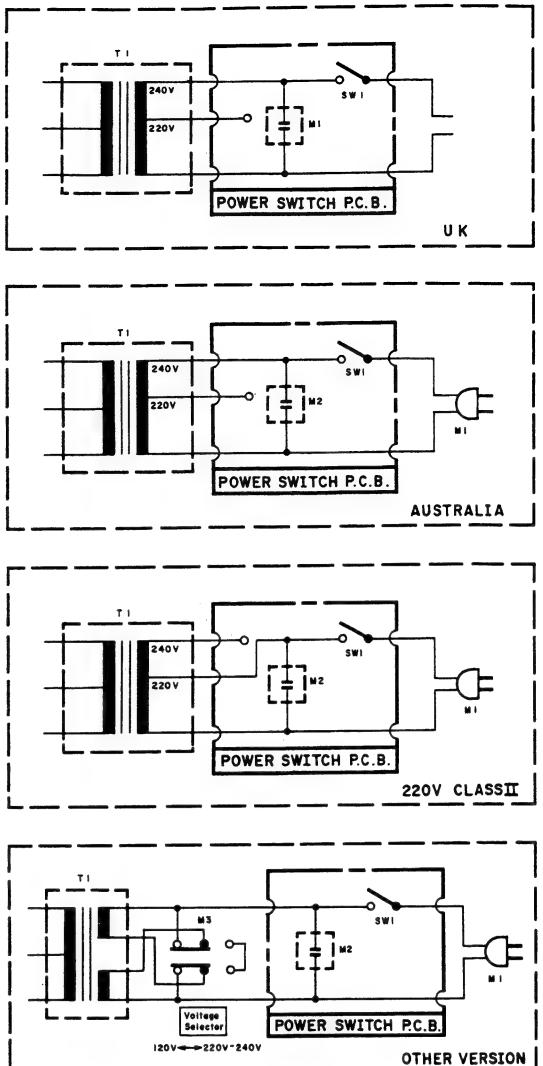
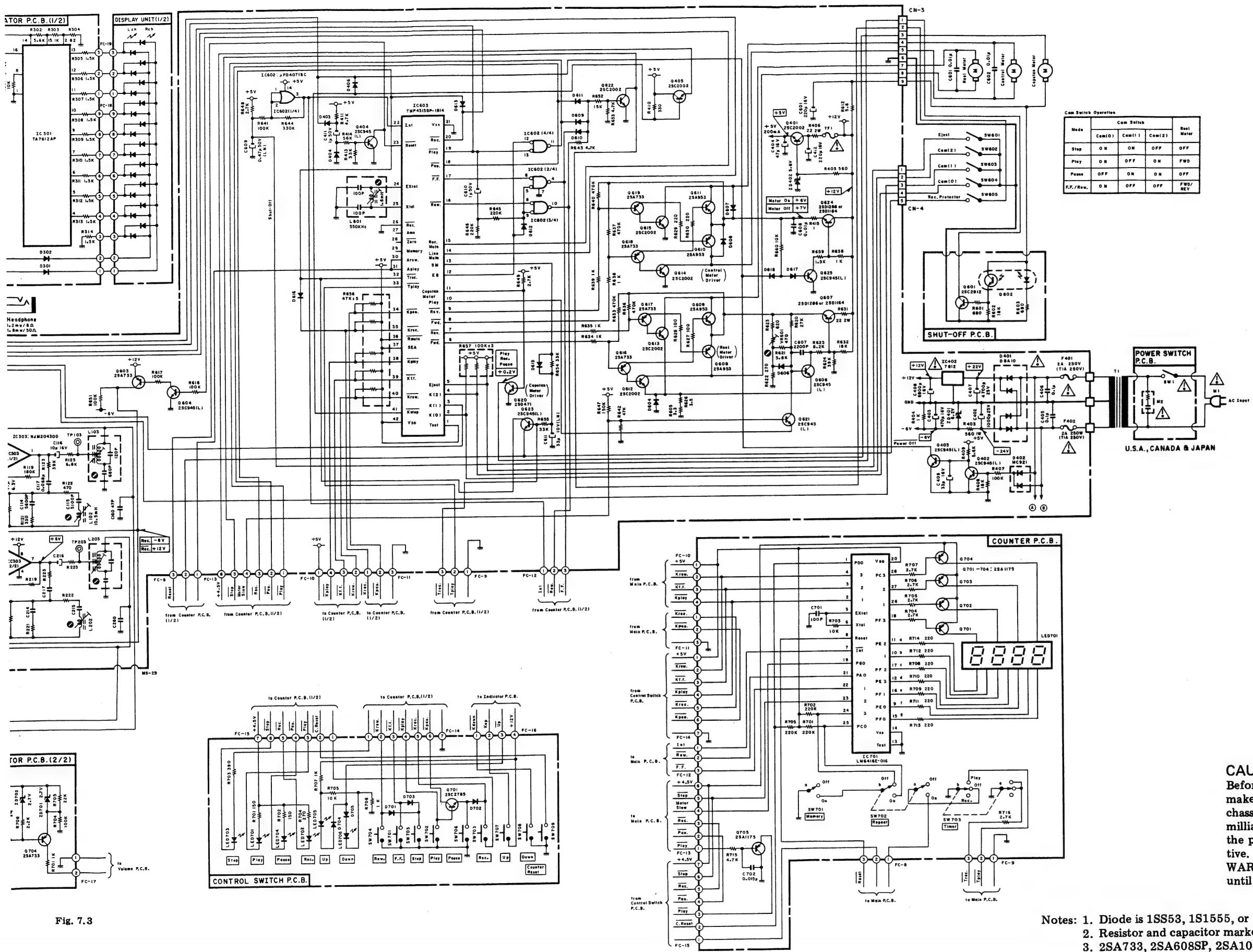


Fig. 7.2.7 4-Bit Micro-processor TMP4315BP-1814

IN0 0 - 3: Input Port IN0
IN1 0 - 3: Input Port IN1
IN2 0 - 3: Input Port IN2
OT0 0 - 3: Output Port OT0
OT1 0 - 3: Output Port OT1
OT2 0 - 3: Output Port OT2
OT3 0 - 2: Output Port OT3
IO0 0 - 3: Bidirectional Port IO0
IO1 0 - 3: Bidirectional Port IO1
RST: Reset
INT: Interrupt
XIN, XOUT: Clock Terminals

7.3. Schematic Diagram





CAUTION:

CAUTION: Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective.

WARNING — DO NOT return the unit to the customer until the problem is located and corrected.

Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.

2. Resistor and capacitor marked with * show typical value.

3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.

4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

8. WIRING DIAGRAM

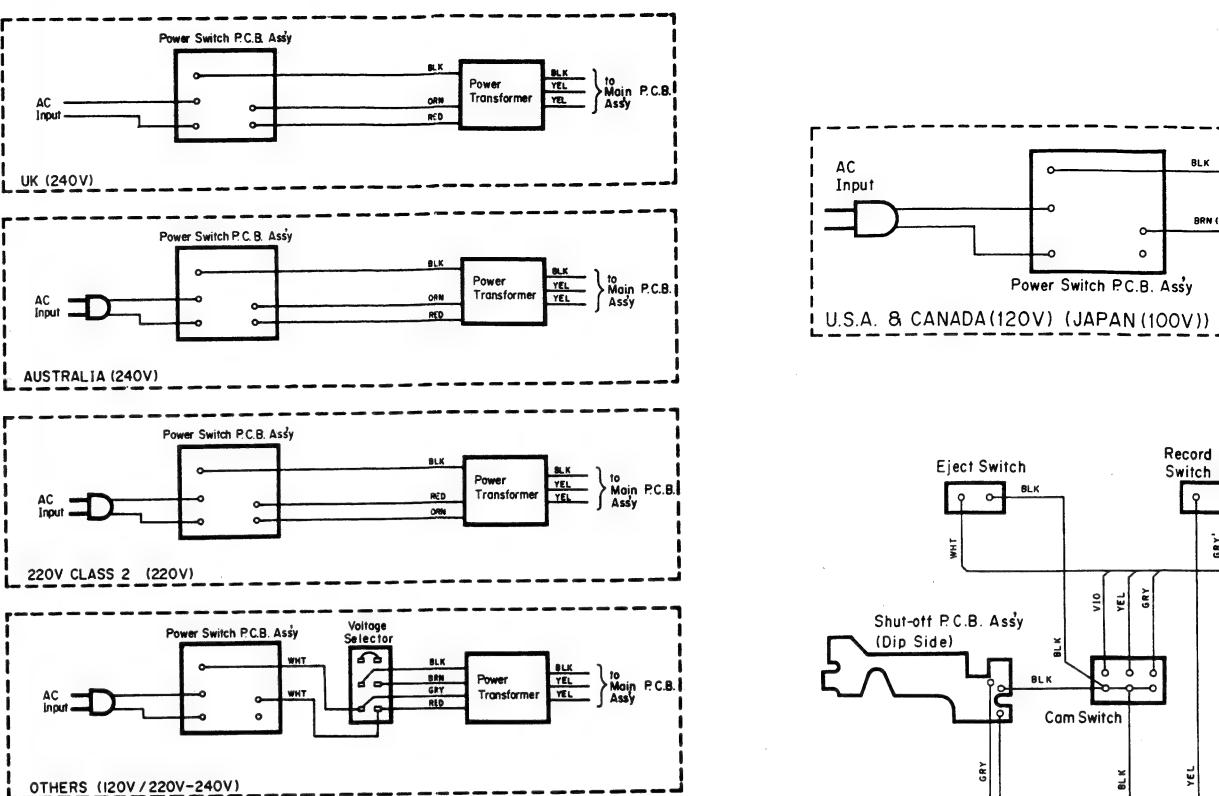
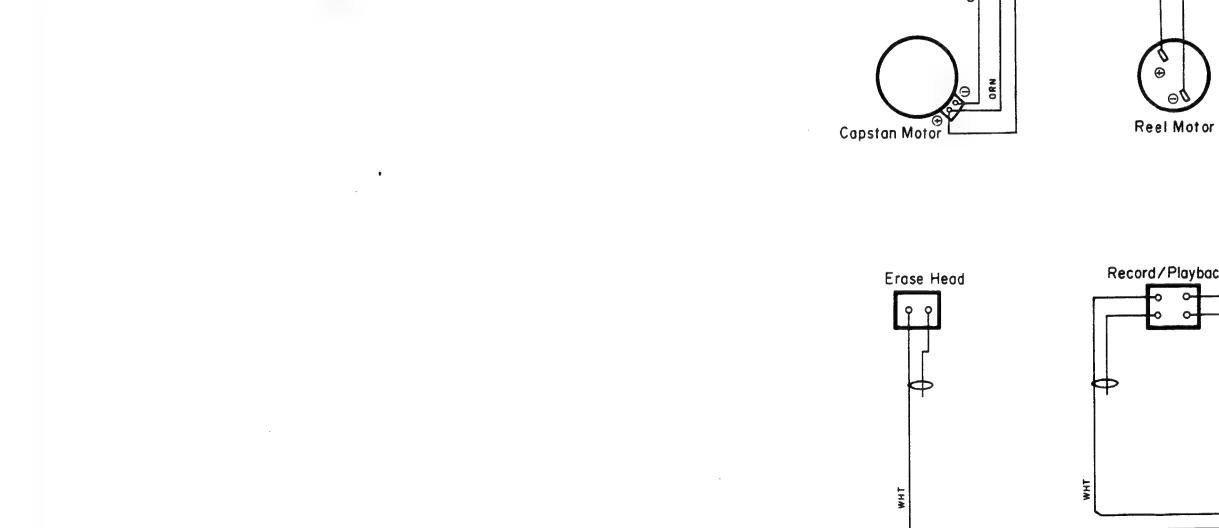


Fig. 8.1



Notes: 1. Table of wire colors

BRN	Brown	BLU	Blue
RED	Red	VIO	Violet
ORN	Orange	GRY	Gray
YEL	Yellow	WHT	White
GRN	Green	BLK	Black

2. Component side view of the P.C.B. is illustrated unless otherwise specified.

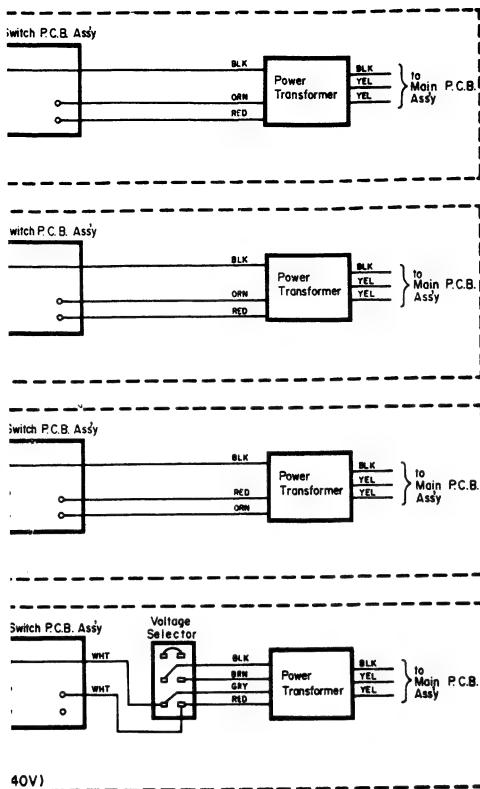


Fig. 8.1

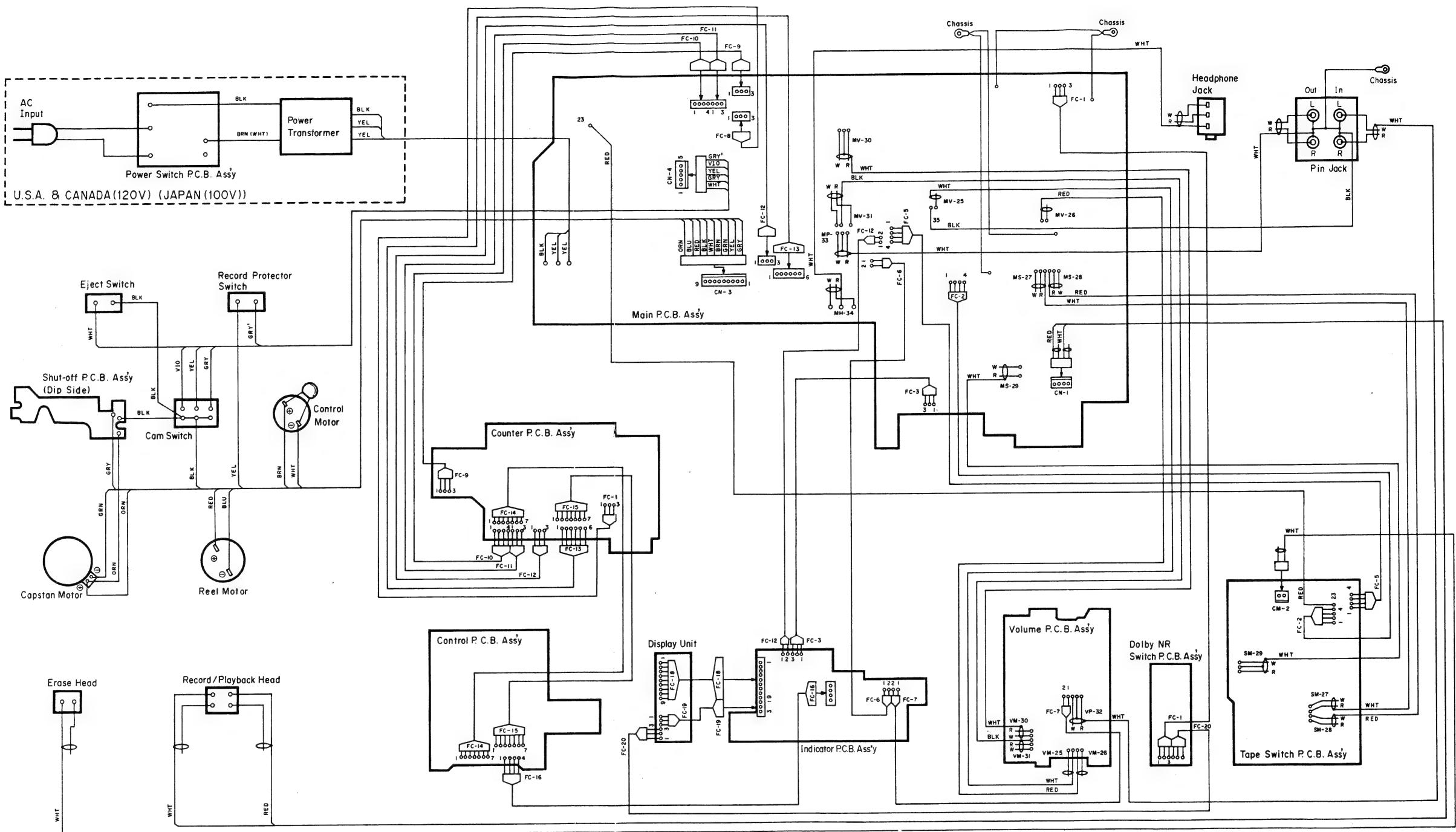


Fig. 8.2.1 2nd Version

wire colors

- Brown BLU — Blue
- Red VIO — Violet
- Orange GRY — Gray
- Yellow WHT — White
- Green BLK — Black

ent side view of the P.C.B. is illustrated unless otherwise specified.

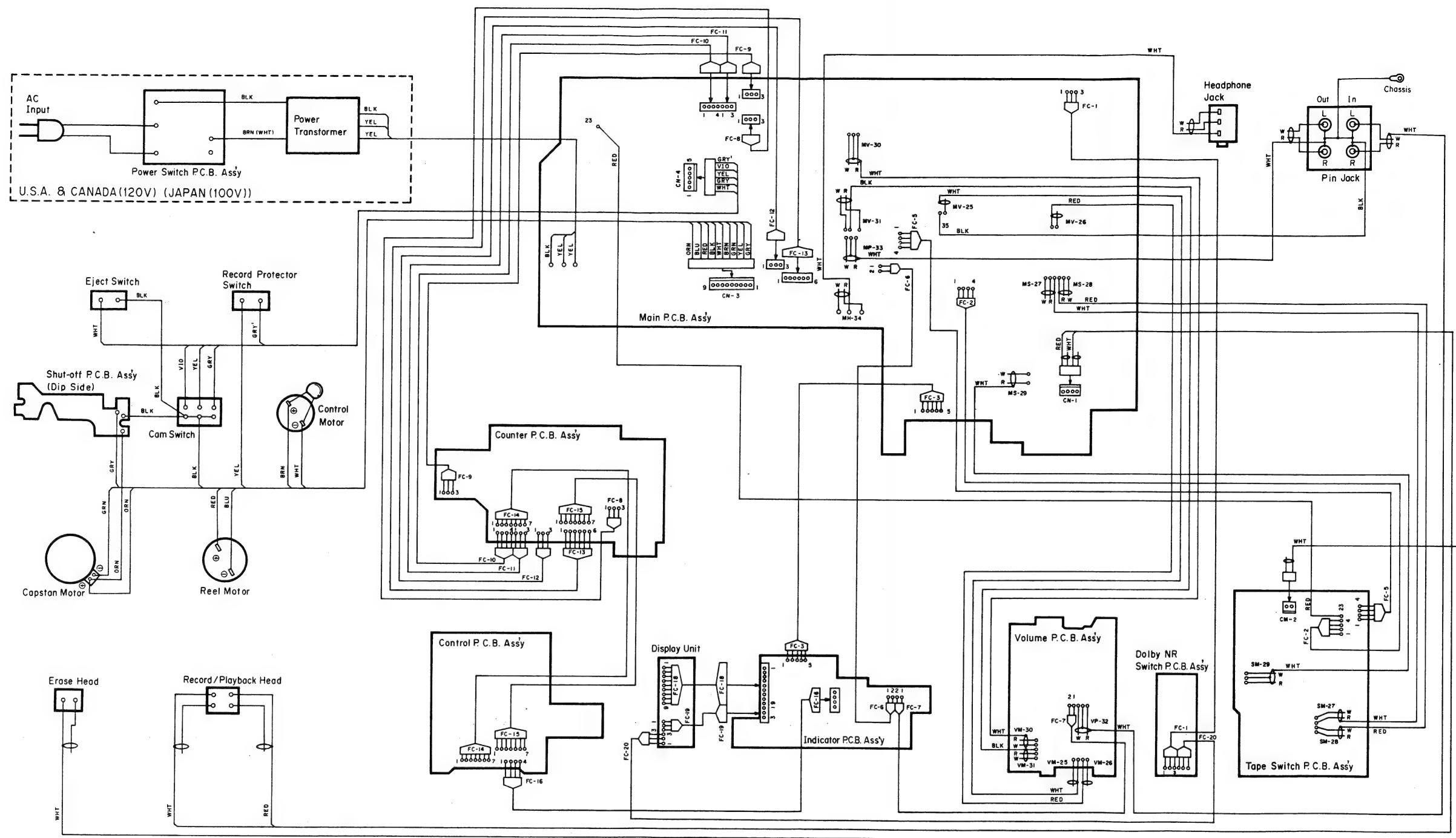


Fig. 8.2.2 1st Version

9. BLOCK DIAGRAMS

9.1. Amplifier Section

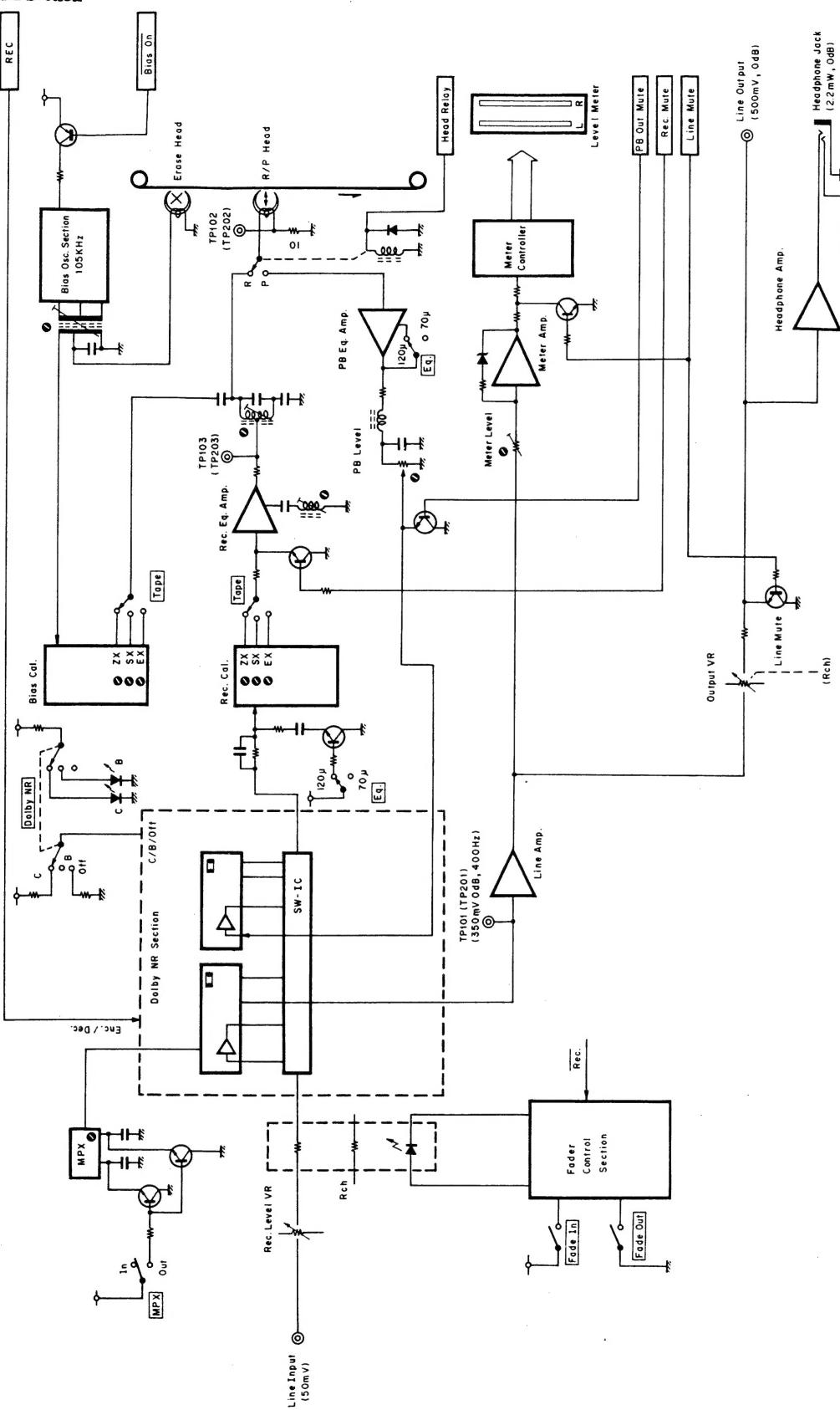


Fig. 9.1

9.2. Mechanism Control Section

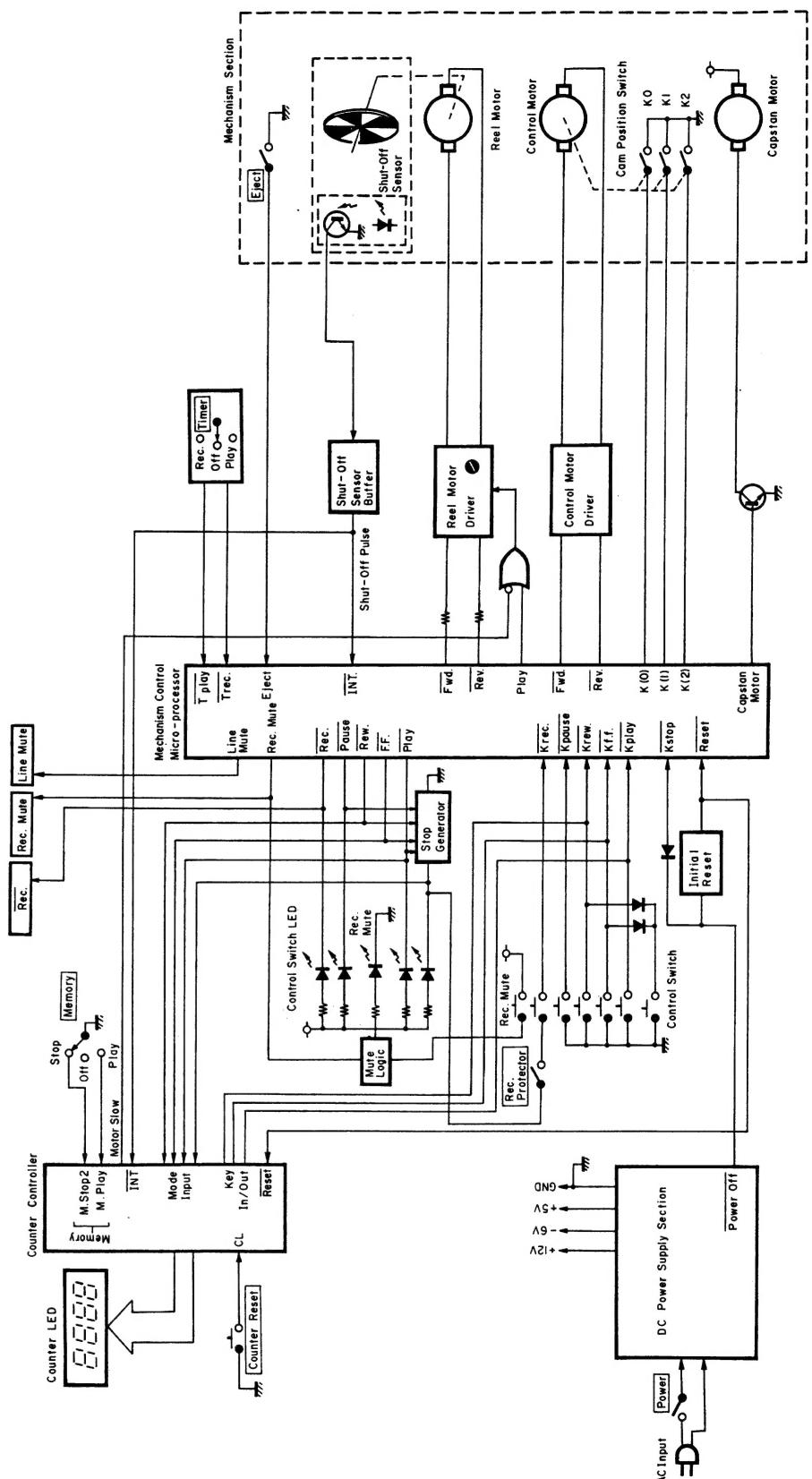


Fig. 9.2

10. TIMING CHART AND EQ. AMP. FREQUENCY RESPONSE

10.1. Timing Chart

(1) Overall Timing Chart

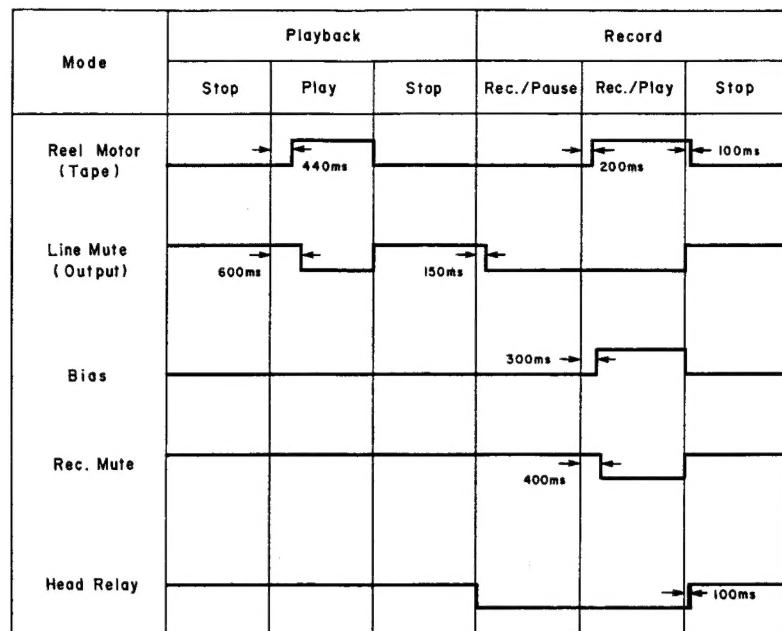


Fig. 10.1.1

(2) Mechanism Control Timing Chart

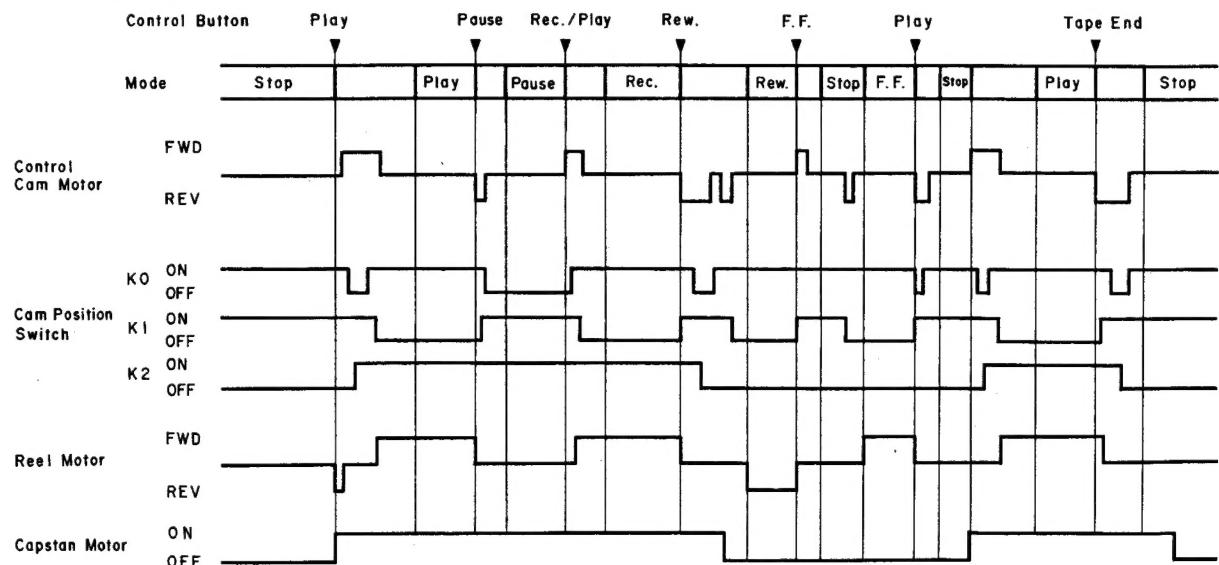


Fig. 10.1.2

10.2. Eq. Amp. Frequency Response
(1) Playback Frequency Response

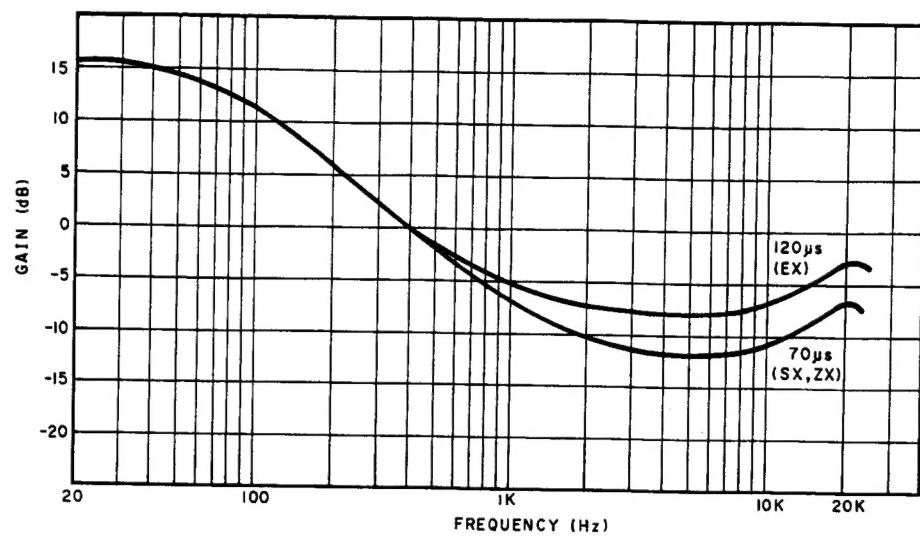


Fig. 10.2.1

(2) Record Current Frequency Response

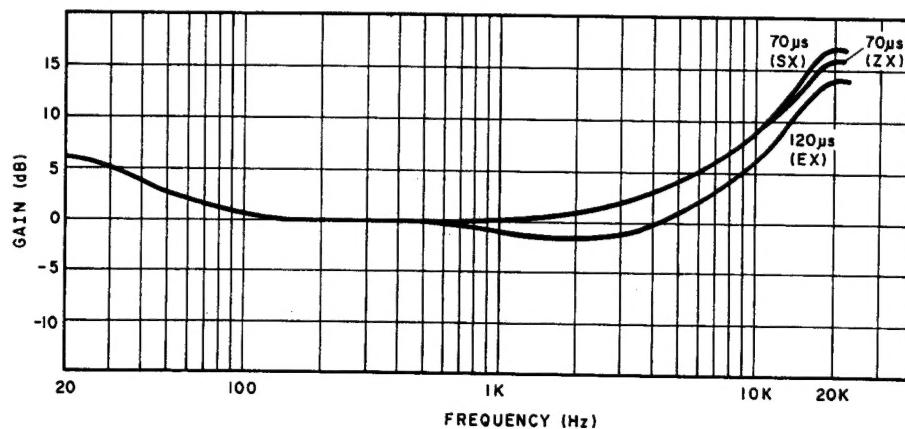


Fig. 10.2.2

11. SPECIFICATIONS

Track Configuration	4 Tracks/2-Channel Stereo
Heads	2 (Erase Head x 1, Record/Playback Head x 1)
Motors (Tape Transport)	DC Servo Motor (Capstan Drive) x 1 DC Motor (Reel Drive) x 1
Power Source	100, 120, 120/220-240, 220 or 240V AC; 50/60 Hz (According to country of sale)
Power Consumption	23 W max.
Tape Speed	1-7/8 ips. (4.8 cm/sec.) $\pm 0.5\%$
Wow-and-Flutter	Less than 0.11% WTD Peak Less than 0.06% WTD RMS
Frequency Response	20 Hz—20,000 Hz (recording level -20 dB)
Signal-to-Noise Ratio	Dolby C-Type NR on <70 μ s, ZX tape> Better than 68 dB (400 Hz, 3% THD, IHF A-WTD RMS) Dolby B-Type NR on <70 μ s, ZX tape> Better than 62 dB (400 Hz, 3% THD, IHF A-WTD RMS)
Total Harmonic Distortion	Less than 1.0% (400 Hz, 0 dB, ZX, EXII tape) Less than 1.2% (400 Hz, 0 dB, SX tape)
Erasure	Better than 60 dB (100 Hz, 0 dB)
Separation	Better than 36 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV, 30 k Ω
Output (Line)	0.5 V (400 Hz, 0 dB, output level control at max.) 2.2 k Ω (Headphones) 2.2 mW (400 Hz, 0 dB, output level control at max.) 8 Ω load
Fast-Winding Time	Approx. 85 seconds (with C-60 cassette)
Dimensions	430 (W) x 110 (H) x 250 (D) millimeters 16-15/16 (W) x 4-5/16 (H) x 9-7/8 (D) inches
Approximate Weight	5.5 kg 12 lb. 2 oz

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